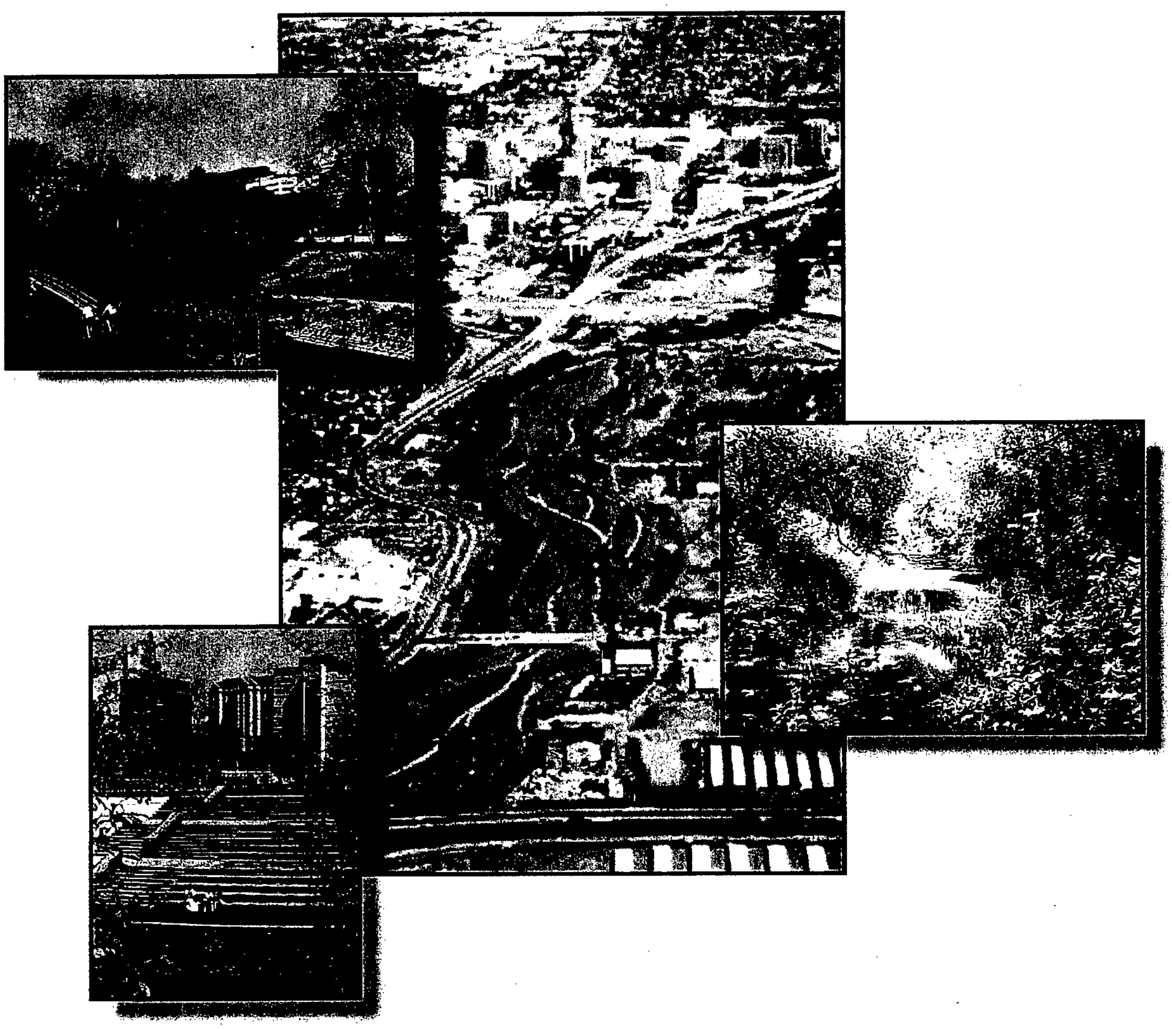
Final General Re-Evaluation & Environmental Report for Proposed Project Modifications

Guadalupe River Project
Downtown San Jose, California



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13. ABSTRACT *(Maximum 200 words)*

This report addresses proposed modifications to the federally authorized Guadalupe River Project in downtown San Jose, California. These modifications include flood protection, recreation and related mitigation measure primarily along 2.6 miles of the Guadalupe River and two related offsite mitigation areas. This report support decision making by the U.S. Army Corps of Engineers (Corps), Santa Clara Valley Water District (SCVWD), and other responsible agencies to implement proposed project modifications and ensure compliance with the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other pertinent laws and regulations.

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Integrated General Re-Evaluation Report/ Environmental Impact Report- Supplemental Environmental Impact Statement for

Proposed Modifications to the Guadalupe River Project, Downtown San Jose, California

(Supplemental to the 1985 Final Environmental Impact Statement for the Guadalupe River Flood Control and Adjacent Streams Investigation, Santa Clara County, California)

Volume 1

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FINAL
INTEGRATED GENERAL RE-EVALUATION REPORT/ ENVIRONMENTAL IMPACT REPORT-SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
for
Proposed Modifications to the Guadalupe River Project
Downtown San Jose, California

The responsible Federal lead agency is the U.S. Army Corps of Engineers, Sacramento District. The responsible State lead agency is the Santa Clara Valley Water District. The City of San Jose and the San Jose Redevelopment Agency are cooperating agencies.

Abstract: This Report describes and evaluates the potential environmental, social, and economic effects of proposed modifications to the Guadalupe River Project authorized by Congress under Section 401(b) of the Water Resources Development Act of 1986 (Public Law 99-662) and amended by the Energy and Water Development Appropriations Act For Fiscal Year 1990 (Public Law 101-101). These modifications include flood protection, recreation, and related mitigation measures primarily along 2.6 miles of the Guadalupe River in downtown San Jose. This Report will support decision making by the U.S. Army Corps of Engineers, Santa Clara Valley Water District, and other responsible agencies to implement the proposed modifications and to ensure compliance with the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other pertinent laws and regulations.

The Report analyses consider an array of alternative plans developed to modify the authorized project and meet the primary planning objectives to (1) provide 100-year flood protection for the downtown San Jose area; (2) protect species recently listed under the Endangered Species Act; (3) meet conditions for State water quality certification under the Clean Water Act; and (4) further improve recreation opportunities along the river corridor in a manner that would avoid and minimize adverse impacts to the maximum extent practicable. Many alternatives have been considered including revised channel widening, upstream detention, retention of the original authorized project design with additional mitigation, channel bypass alternatives, and no action. The Proposed Action fulfills all stated objectives and criteria of the project. The Proposed Action includes modification, construction, operation, and maintenance of the remaining components of the Guadalupe River Project, including an underground bypass to convey floodwaters around existing riparian habitat and expanded onsite and offsite mitigation measures to meet habitat restoration objectives. Potential cumulative effects of construction of the Proposed Action, including mitigation measures, also have been considered and addressed. Information referred to in this document and appendices is incorporated by reference.

The Draft Report was distributed to the public and regulatory agencies on June 26, 2000 and the comment period closed on August 9, 2000. The Corps and SCVWD received written and oral comments on the Draft Report and conducted a public hearing on the Draft on July 26, 2000, in San Jose, California. Appendix 4, in Volume 2, contains comments and responses and the Final Report was revised accordingly.

CLOSING DATE FOR RECEIPT OF PUBLIC COMMENTS ON FINAL REPORT: MAY 29, 2001

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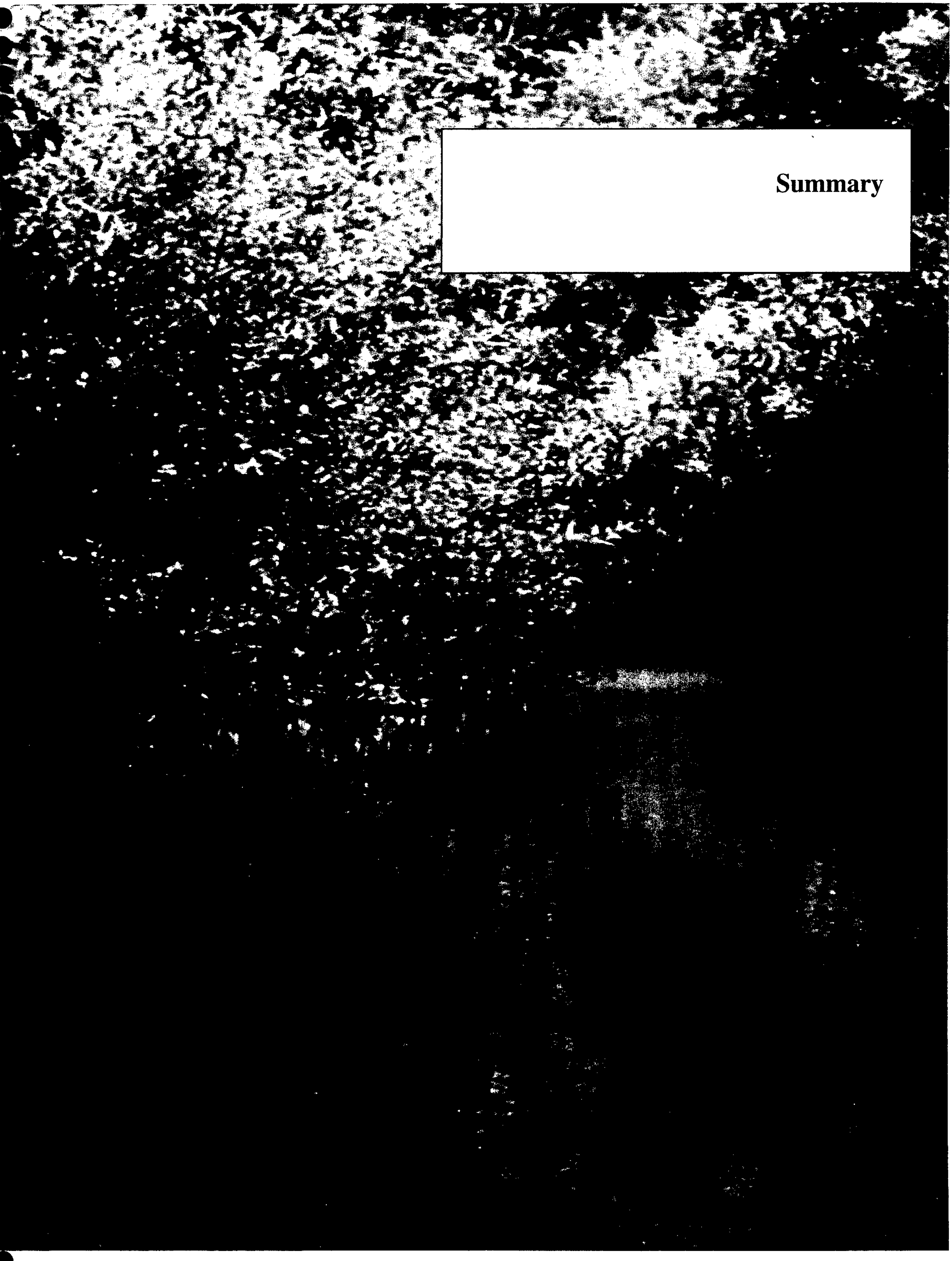

Summary

KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions:

The Refined Bypass System Alternative is now identified as the Proposed Action alternative. This change was made after the Refined Bypass System Alternative was found to be environmentally superior, environmentally preferable, and less costly during the lead agencies' review of the Draft Report (see Chapters 2, 5, and 8 for details on this revision).

Responses to public comments on the Draft Report are presented in Appendix 4 (Volume 2). Appendix 4 presents text with highlights and strikeouts showing where specific text in the Draft Report was modified in response to comments.

Chapter 3 provides additional detail on the Soil Management Plan used to test excavated soil during the construction period for constituents of concern and on the construction period Groundwater Dewatering and Treatment Plan.

Chapter 4 presents additional information on existing hazardous material areas and the condition of mercury-laden soils in the Guadalupe River watershed.

Chapter 5 presents potential environmental impacts of the No Action, Bypass System, and Refined Bypass System Alternatives. Impacts of the Bypass System and Refined Bypass System Alternative are nearly identical except that: (1) river bank armoring under the Refined Bypass System Alternative is 200 linear feet less than under the Bypass System Alternative; and (2) the related environmental effects are slightly less impact to SRA and to riparian wildlife habitat resources, but slightly more impact to recreation, public access, and visual resources due to realignment of the recreation trail.

Additional post-Draft Report modeling analyses (i.e., HEC-6 Movable Bed Numerical Modeling Analysis) were conducted to better refine the determination of potential impacts on erosion, sedimentation, and the river's geomorphology. The assessment regarding river morphology has been revised and now concludes that the proposed project would have a less-than-significant adverse effect on channel erosion downstream of the Coleman Street Bridge and on sediment deposition between Santa Clara and Coleman.

Additional detail regarding potential beneficial effects of the project on the overall reduction of mobile mercury-laden sediments in the project reach has been added to the Water Quality Section.

Additional discussions of the bypass inlet structures are presented in the Recreation, Public Access, and Visual/Aesthetic Resources Section.

Chapter 6, Cumulative Impact Analysis has been revised to consider nine other planned projects in addition to those projects previously addressed in the Draft Report, that are also likely to be constructed in the Guadalupe River watershed.

Summary

S.1 Introduction

This Integrated General Re-Evaluation Report/ Environmental Impact Report-Supplemental Environmental Impact Statement (GRR/EIR-SEIS or Report hereafter) addresses proposed modifications to the federally authorized Guadalupe River Project in downtown San Jose, California. These modifications include flood protection, recreation, and related mitigation measures primarily along 2.6 miles of the Guadalupe River and two related offsite mitigation areas. This Report will support decision making by the U.S. Army Corps of Engineers (Corps), Santa Clara Valley Water District (SCVWD), and other responsible agencies to implement proposed project modifications and ensure compliance with the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other pertinent laws and regulations. Potential direct and indirect environmental, social, and economic effects of the Proposed Action and alternatives are evaluated and project modifications are recommended for implementation. The Report has been prepared by the Sacramento District of the Corps and SCVWD, serving as Federal and State lead agencies.

S.1.1 Project Background

The multiple-purpose Guadalupe River Project is under phased construction in downtown San Jose. When all phases are completed, the project will provide a 100-year level of flood protection to downtown San Jose and surrounding areas while avoiding, minimizing, or mitigating adverse project effects on fish and wildlife habitat for threatened and endangered species.

The Guadalupe River Project was authorized by Congress in 1986 to provide flood protection and amended in 1990 and 1991 to add additional environmental protection and include features for recreation. Construction of the Authorized Project began in 1992 after conditional State water quality certification was obtained, as required under Section 401 of the Clean Water Act (CWA). A condition of the 1992 water quality certification required that a Mitigation and Monitoring Plan (MMP) be developed for the Authorized Project. A June 1992 MMP specified protective and mitigation measures for riparian vegetation, fish spawning-gravel, fish passage, and thermal impacts. Installation of these measures began in 1994 and has continued in cooperation with relevant resource agencies under current clearances and permits.

S.1.2 Need for Project Modification

Construction of the Authorized Project's flood protection components stopped in 1996 due to concerns regarding the adequacy of the mitigation, new and proposed listings of threatened and endangered species in the project area (Central California Coast steelhead and fall-run chinook salmon), and the receipt of a notice of intent to sue from four environmental organizations. These environmental organizations were concerned that (1) the third and final phase of the Authorized Project, comprised mainly of concrete-lined channels, would harm steelhead and chinook salmon runs and (2) the riparian mitigation in the 1992 MMP did not adequately replace the quality as well as the quantity of shaded riverine aquatic (SRA) cover affected by the project.

S.1.3 Agency and Citizen Collaboration

In June 1997, staff from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and the California State Water Resources Control Board (SWRCB) met with the Corps and SCVWD to express their concerns about the then-existing mitigation measures for the project. The following priorities were identified by the resource agencies.

- Redesign the project to avoid impacts and maximize onsite mitigation.
- Maximize onsite revegetation to replace shaded riverine aquatic (SRA) cover.
- Replace the quality as well as the quantity of affected SRA cover.
- Provide additional fisheries mitigation.
- Provide thermal mitigation.

In December 1997, the Corps and SCVWD joined with the City of San Jose (City) and the San Jose Redevelopment Agency (SJRA) to initiate a collaborative and facilitated program to resolve the mitigation disputes. Thus, the Guadalupe River Flood Control Project Collaborative (Collaborative) was established, comprised of representatives involved in the dispute resolution process: Corps, SCVWD, City, SJRA, USFWS, NMFS, CDFG, SWRCB, California Regional Water Quality Control Board (RWQCB), and the Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited (represented by the Natural Heritage Institute [NHI]).

In July 1998, the Corps and SCVWD agreed to redesign a portion of the Authorized Project to minimize impacts on SRA habitat and to revise the project's mitigation plan. Since then, the Corps and SCVWD, in coordination with environmental regulatory agencies and the Collaborative, have been refining objectives, investigating project modifications that satisfy the Endangered Species Act (ESA) and the CWA, and working to develop an acceptable mitigation and monitoring plan.

S.1.4 Primary Objectives

The following design, construction, and environmental objectives were developed by the Corps, SCVWD, and others through an iterative process and then used to develop alternative plans for project modifications.

- Reduce flood damage from the Guadalupe River in downtown San Jose by conveying flows up to 17,000 cubic feet per second (cfs) through the project area consistent with the Authorized Project.
- Avoid potential adverse impacts on fish and wildlife habitat, with special emphasis on remnant steelhead trout and chinook salmon using the opportunities associated with construction of the flood protection components.
- Mitigate for unavoidable adverse impacts on environmental resources by replacing quantity and quality of affected fish and wildlife habitat.
- Be consistent with redevelopment plans adjacent to the Guadalupe River in downtown San Jose through integration with the Guadalupe River Park and Gardens Master Plan, downtown redevelopment plans, and preservation of historic and cultural resources.
- Provide recreational elements compatible with local recreational plans and the Corps' 1991 General Design Memorandum (GDM) for the Authorized Project and the City's 1995 Master Plan EIR.
- Provide a minimum flow of 1,500 cfs in the river channel prior to diversion for floods to maintain natural geomorphic processes and fish and wildlife habitat.
- Reduce erosion of the riverbed and banks to preserve existing habitat.
- Design modifications to the Authorized Project so that they will not cause elevated water temperature which may harm anadromous fish species during the life of the project, including the transition period before replacement vegetation matures.
- Design modifications to the Authorized Project to provide migration of anadromous fish through the project area.

S.1.5 Purpose of Proposed Project Modifications

The primary purpose of proposed project modifications described in this Report is to provide 100-year flood protection for downtown San Jose by modifying and completing the Authorized Project, consistent with requirements for protecting the environmental quality of the Guadalupe River. A secondary but important purpose is to provide recreational access to the Guadalupe River pursuant to the City's master plan for the Guadalupe River corridor.

Proposed modifications to the Authorized Project include an underground bypass to convey floodwaters around important riparian habitat, expanded onsite and offsite mitigation, and refinements to recreational features.

S.1.6 Project Area

The project area for resources evaluated in the Report includes two areas along the Guadalupe River and one area along Guadalupe Creek in Santa Clara County, California. The flood protection project is along the 2.6 mile reach of the Guadalupe River in downtown San Jose between Grant Street (just upstream from I-280) and I-880. It includes the river, its banks, and land adjacent to the bank. The offsite mitigation areas include (1) an area just downstream from I-880 and adjacent to the San Jose Airport, identified as the Reach A

mitigation site, and (2) the Guadalupe Creek mitigation site, an area along Guadalupe Creek, from 660 feet downstream from Masson Dam to the Almaden Expressway. Guadalupe Creek is approximately 4 miles upstream from the downtown flood protection area. The offsite mitigation areas do not include land outside the riverbanks. (Figure 1.0-2).

S.1.7 Environmental Impact Report-Supplemental Environmental Impact Statement

This Report includes information that meets the requirements of NEPA and CEQA and other pertinent planning and environmental laws and regulations. A supplemental EIS is being prepared because the Authorized Project has been substantially modified and there are new circumstances and information relevant to the environmental concerns previously identified. Chapters 1 through 7 of this Report comprise the EIR-SEIS for the Proposed Action and alternatives, and fulfill the requirements of both CEQA and NEPA. Chapter 1, "Introduction," provides background information concerning the purpose and need for the Proposed Action, as well as the scope and intent of the EIR-SEIS, highlights agency concerns and public concerns expressed during the planning process, and notes linkages with other project, permit, and consultation requirements. Chapter 2, "Development and Evaluation of Alternative Project Modifications," discusses the formulation, evaluation, and screening of alternative plans and scenarios that led to identification of the Proposed Action, and also provides descriptions of alternatives that were eliminated from further consideration. Chapter 3, "Alternatives, Including the Proposed Action," provides descriptions of the No-Action Alternative, the Bypass System Alternative, the Refined Bypass System Alternative (Proposed Action), and the Extended Bypass alternative. Chapter 4, "Affected Environment," describes the existing conditions for specific environmental resources present in the project area. Chapter 5, "Environmental Consequences," analyzes the environmental impacts associated with implementation of the Proposed Action and other alternatives. Chapter 6, "Cumulative Impacts and Other Required Analyses," analyzes the cumulative environmental impacts associated with implementation of the Proposed Action and alternatives in conjunction with other known past, present, and future projects in the project area. Chapter 7, "Coordination and Consultation," summarizes public and agency involvement in all aspects of the planning process and provides the reader with information on future opportunities to refine the Proposed Action. Report recipients and preparers are identified in Chapters 9 and 10, respectively.

S.2. Major Conclusions

S.2.1 Preliminary Analysis and Comparison of Alternative Modification Plans

The Authorized Project was evaluated in the 1985 EIS (U.S. Army Corps of Engineers, 1985) and in two Environmental Assessments that tiered off the 1985 EIS (U.S. Army Corps of Engineers, 1990, 1991a). Since 1996, numerous alternative plans for modification of the Authorized Project have been considered as part of the re-evaluation process. The alternative plans that have been considered include:

- No Action
- A revised channel-widening plan

- An upstream detention plan
- The authorized project with additional mitigation
- Six preliminary bypass designs
- Eight variations of the preferred bypass design

The alternatives evaluated in this Report were developed from these 18 alternative plans using an extensive and thorough screening process based on the following criteria:

- Meeting the primary objectives noted in Section S.1.4 above
- Avoiding adverse environmental effects wherever possible
- Fully compensating for unavoidable environmental effects
- Conforming with evaluation criteria developed by the U.S. Water Resources Counsel (Section 2.1.2)

Chapter 2, "Development and Evaluation of Alternatives," provides a more-detailed description of the development of alternative plans and subsequent selection of a preferred alternative plan for modification of the Authorized Project.

S.2.2 Rationale for Selection of Alternatives

The GRR process eliminated all but three of the alternative plans from further analysis under both NEPA and CEQA because they:

- Would not provide the flood protection needed or did not adequately address other hydrologic concerns
- Were infeasible because of excessive construction costs
- Would result in unacceptable adverse environmental effects

The Authorized Project previously proposed concrete armoring for most of the riverbank and riverbed in Segments 3A and 3B. That project would have had significant effects on riparian habitat and SRA cover that would result in significant adverse thermal impacts on fish habitat. Analyses indicated that no mitigation plan could be developed to mitigate these anticipated thermal impacts. The underground bypass proposed in the Bypass System Alternative would reduce the amount of riparian vegetation and SRA cover affected, while still meeting the original goal of providing flood protection to downtown San Jose and vicinity. The proposed bypass would also significantly reduce the need for riverbank and riverbed armoring required with the Authorized Project. As described in Chapter 2, Section 2.3, "Preliminary Alternative Selection and Rationale," a bypass system was selected as the best method for avoiding or minimizing effects on riparian resources and on federally listed fish and wildlife species. The bypass system would run underground on the east side of the Guadalupe River from the vicinity of West Santa Clara Street to Coleman Avenue.

Selection of the Bypass System Alternative, as well as the Refined Bypass System Alternative (Proposed Action), from the array of modified alternative plans was based on assessment of their potential environmental, economic, and social effects using (1) U.S.

Water Resources Counsel and Corps planning principles and guidelines for plan formulation and evaluation and (2) other screening criteria noted in Section S.2.1, pursuant to NEPA and CEQA requirements.

Under NEPA, the range of alternatives required in an EIS is governed by a "rule of reason." Alternatives that do not meet the project's purpose and need or do not satisfy the lead agency's practicability criteria need not be evaluated in the EIS. Under NEPA, "practicability" is defined on the basis of economic feasibility, environmental considerations, and technical feasibility of an alternative. In addition to reasonable alternatives, NEPA also requires the lead agencies to assess the no-action alternative.

Under CEQA, the range of alternatives required in an EIR is also governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives must be limited to those that meet most of the project objectives, are apparently feasible, and would avoid or substantially lessen at least one of the significant environmental effects of the project. Under CEQA, other presented alternatives need to have less environmentally damaging effects than a Proposed Action. Of those alternatives, the EIR needs to examine in detail only the alternatives that the lead agencies determine are feasible for attaining most of the basic project objectives. In addition to reasonable project alternatives, CEQA also requires that the lead agencies assess a no-project alternative, even if the no-project alternative is not within the reasonable range.

The Bypass System Alternative and the Refined Bypass System Alternative (Section S.2.3) are the only practicable alternatives that fulfill the stated objectives and criteria pursuant to the requirements of both CEQA and NEPA.

The Extended Bypass Alternative, based on the initial screening of alternatives in this Report, (Section 2.2.5.2, "Eight Bypass Variations") and the analysis of impacts of the alternative in this Report, (Section 5.16, "An Analysis of an Additional Alternative Considered for CEQA Purposes") was determined to be not practicable on the basis of constructibility issues, right-of-way issues, Caltrans permit issues, effects on traffic from the closure of Route 87 during construction, and an expected 2 to 4 year delay in schedule (Section 5.16, "An Analysis of an Additional Alternative Considered for CEQA Purposes"). In addition, the cost would be excessive. The Extended Bypass Alternative is estimated to cost $40-100 million more than the Proposed Action depending on how State Route 87 would be relocated or rebuilt. The modest incremental environmental gain has been judged to be not worth the substantial incremental cost to obtain it. In addition, delay in obtaining reduced flood damage benefit and public use benefit from completing the project as scheduled would add to this cost.

S.2.3 Descriptions of Alternative Modifications Considered in Detail

S.2.3.1 No Action

The No-Action Alternative is required pursuant to NEPA, and a no-project alternative is required for CEQA. Hereafter called the No-Action Alternative, this alternative assumes the likely future conditions in the project area without implementation of any of the action alternatives. Likely future conditions include planting of some riparian vegetation and SRA cover vegetation, and the replacement of spawning gravels needed to compensate for temperature and fish and wildlife habitat effects associated with the completed Segments 1, 2,

and 3C Phase 1 and Phase 2. However, the Authorized Project would not be completed, objectives for flood and environmental protection would not be met, and an unacceptable public health and safety hazard — flooding in downtown San Jose — would occur.

S.2.3.2 Bypass System Alternative

The Bypass System Alternative includes modifications to the Authorized Project to accomplish the following objectives.

- Provide 100-year flood protection for the downtown San Jose area.
- Protect species recently listed or proposed for listing under the ESA.
- Meet conditions for water quality certification under the CWA.
- Refine recreational opportunities along the Guadalupe River corridor.
- Implement mitigation commitments specified in a new MMP.

The Bypass System Alternative includes the construction and operation of an underground bypass system to convey floodwaters around important riparian habitat in Segments 3A and 3B; onsite mitigation plantings in Segments 3A and 3B; expanded offsite mitigation in the Reach A and Guadalupe Creek mitigation sites; riverbank and channel bed armoring, including a new low-flow channel design in armored channel bed sections; invert stabilization structures; pedestrian trails/maintenance roads between Coleman Avenue and Park Avenue; construction of flood training walls in Segment 3C Phase 3; and the operation of the entire Guadalupe River Project.

The Segment 3A reach is between Coleman Avenue and New Julian Street. The Segment 3B reach extends from New Julian Street to Park Avenue. The Segment 3C Phase 3 subreach is at the upstream end of the project near I-280. The Bypass System Alternative includes construction of flood protection features in the Segment 3A and 3B reaches during 2002 through 2004 and in the Segment 3C Phase 3 subreach during 2003 and 2004. Installation of SRA cover mitigation began in 1999 and will continue through 2004. Installation of anadromous fish habitat mitigation began in 1994 and will continue through 2004.

The Bypass System Alternative is described in Section 3.4.2, "Construction Features." Measures to compensate for adverse environmental effects of the Bypass System Alternative are described in Section 3.4.3, "Environmental Commitments." The environmental commitments include measures to compensate for effects associated with construction of the Bypass System Alternative, as well as the effects of operation and maintenance of the Guadalupe Project with the Bypass System Alternative.

The Bypass System Alternative includes a continuous riverwalk trail system between Coleman Avenue and Park Avenue. The riverwalk system would accommodate the estimated 1.3 million annual visitors to the project area and provide for flood protection maintenance. Trails that could accommodate maintenance vehicles would be 12 feet wide and include an asphalt surface. Combined trail/maintenance roads would be 18 feet wide and include a 12-foot-wide asphalt border on each side with a 3-foot-wide strip of reinforced turf. Section 3.4.2.8 of this Report describes the recreation and trail features of the Proposed Action Bypass System Alternative in detail.

Construction and mitigation activities under the Bypass System Alternative would be initiated in 2002 and be completed in 2004. Some remaining infill planting for habitat restoration, plus long-term operations and maintenance would continue after 2004. Details of the construction and mitigation installation schedule are summarized in Figure 3.4.7 and described in Section 3.2.5.

Mitigation Measures. Potential adverse environmental impacts that may occur are described in Section S.6 and Tables S.6-1 and S.6-2 (provided at the end of this Summary), and detailed effects are addressed in Chapter 5, "Environmental Consequences."

The Corps and SCVWD incorporated specific environmental commitments and mitigation measures into the design of the Bypass System Alternative to avoid and minimize adverse project effects associated with project construction and operation. The Bypass System Alternative includes compensatory mitigation measures to compensate for unavoidable adverse project effects (Table S.6-2), and an extensive mitigation and monitoring plan. The need for project modifications is based on requirements for adequate compensation for potential adverse effects; particularly concerning listed species of concern and associated habitat, and conditions for water quality certification. Thus, the MMP was developed in full cooperation with concerned resource agencies. These environmental commitments are synonymous with mitigation measures under CEQA.

The MMP uniquely includes commitments for long-term adaptive management of the mitigation features over the life of the project to assure that the success of mitigation measures will be monitored and the management will be adapted based on future conditions. Responsibilities for MMP implementation are discussed in Section S.6.3, "Responsibilities for MMP Implementation." Compensatory SRA cover mitigation would be planted onsite between Woz Way and San Carlos Street, and between St. John Street and I-880. Offsite SRA mitigation would be planted in Reach A (between Airport Parkway and I-880) and on Guadalupe Creek between Masson Dam and Meridian Drive.

In addition to compensatory mitigation measures, the Corps and SCVWD would implement preventive measures to avoid and minimize potential adverse effects on riparian vegetation, including SRA cover, and aquatic resources during construction of the Bypass System Alternative. These preventive measures include implementation of the following project components, as described in Section 3.4.3.1:

- A vegetation protection plan
- An SWPPP
- An erosion and sediment control plan
- A spill prevention and response plan
- A soil management plan
- A hazardous and toxic materials contingency plan
- Fish management in the construction area
- Construction period limits

- Measures to comply with the Migratory Bird Treaty Act
- Bay Area Air Quality Management District (BAAQMD) feasible control measures for emissions of respirable particulate matter smaller than 10 microns (PM10)
- Traffic management
- Parking management
- Cultural resources management

Environmental Commitments. The environmental commitments/mitigation measures designed to avoid, minimize, and mitigate for adverse project effects during and after construction are described in Chapter 3, "Alternatives, Including the Proposed Action." Measures to avoid and minimize potential adverse effects are summarized in Section S.2.3.1.

The Corps and SCVWD will implement measures to compensate for adverse project effects, including:

- Plant 21 acres of native riparian vegetation.
- Maintain water temperature by planting SRA cover vegetation to replace shade lost as a result of project construction.
- Total SRA cover mitigation for the Guadalupe River Project with Bypass System Alternative, based on the HEP analysis, equals 18,026 lf. Onsite SRA cover mitigation lengths will be 575 lf in Segment 1; 1,081 lf in Segment 2, 878 lf in Segment 3A; and 410 lf in Woz Way to Park Avenue Bypass Reach. Offsite SRA cover mitigation will be 7,848 lf in Reach A. Guadalupe Creek, between Masson Dam and Almaden Expressway, would be planted with an estimated 12,044 lf of SRA cover vegetation. A total of 7,234 lf of SRA cover vegetation mitigation on Guadalupe Creek would serve as mitigation for the Guadalupe River Project with Bypass System Alternative.
- Protect the project's compensatory mitigation components in perpetuity.
- Maintain up to 25,190 square feet (sf) of river-run gravel between 1-880 and 1-280.
- Include a low-flow channel in the armored sections of the riverbed to provide fish passage.
- Replace instream fish habitat by providing rock weirs and vanes, rootwads, deflector logs, and boulders, and by planting SRA cover vegetation.
- The MMP includes adaptive management to achieve mitigation objectives and provide for implementation of remedial action (Appendix 3). Key components of the adaptive management process are:
  - Identifying indicators for habitat values and ecological functions. Indicators include:

    Riparian vegetation

    SRA cover vegetation and instream cover

    Water temperature

Anadromous fish spawning habitat

Anadromous fish passage and rearing habitat

Anadromous fish occurrence

Mercury transport and the potential for methylation of mercury

- Setting measurable objectives, including numerical and descriptive goals for the indicators
- Monitoring indicators

Failure to meet measurable objectives will trigger evaluation of the cause of the failure and selection of appropriate remedial actions by the Adaptive Management Team.

S.2.3.3 Refined Bypass System Alternative (Proposed Action)

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative except for 200 feet of the east bank armoring in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would reduce impacts on riparian vegetation and SRA cover vegetation by 0.35 acre and 72 lf, respectively. The east bank recreation trail would cross New Julian Street at grade rather than passing under the bridge. The Refined Bypass System Alternative would include the same mitigation measures and environmental commitments identified for the Bypass System Alternative (Section 3.4.3).

The Refined Bypass System Alternative has been identified as the NED Plan, the Least Environmentally Damaging Project Alternative (LEDPA) under Section 404(b)(1) of the Clean Water Act, the environmentally preferred alternative under NEPA for Corps decision makers, and as the environmentally superior alternative under CEQA for SCVWD decision makers.

The Refined Bypass System Alternative is also recognized as the Recommended Plan/ Proposed Action and the Locally Preferred Plan (LPP) for Corps and SCVWD decision-makers, subject to further modification at the discretion of the Chief of Engineers, if agreed to by Corps and SCVWD.

S.2.3.4 Extended Bypass Alternative

The Extended Bypass Alternative would include all the flood protection components that would be constructed as part of the Bypass System Alternative except the inlets to bypass culverts "A" and "B" would be upstream near the outlet of the Woz Way to Park Avenue bypass. The length of the bypass system would be approximately 2,000 feet longer than with the Bypass System Alternative. The Extended Bypass Alternative would result in approximately 2,732 lf less channel bank armoring than with the Bypass System Alternative and approximately 1,216 lf less riverbed armoring than the Bypass System Alternative. The Extended Bypass Alternative would reduce impacts on riparian vegetation and SRA cover vegetation by 2.27 acres and 1,628 lf, respectively.

S.2.4 Environmentally Preferred Alternative/Least Environmentally Damaging Project Alternative

The Corps and SCVWD have identified the Refined Bypass System Alternative as the environmentally preferred and the environmentally superior alternative, pursuant to the requirements of NEPA and CEQA, respectively, and as the Least Environmentally Damaging Practicable Alternative (LEDPA) under CWA (Appendix 1D). As defined by NEPA and CEQA, the environmentally preferred and the environmentally superior alternative is the alternative that causes the least damage to the biological and physical environment and protects, preserves, and enhances historic, cultural, and natural resources while accomplishing the project's objectives. The Clean Water Act, specifies that the LEDPA must be considered in development of alternatives and it must be "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of project purposes."

The selection of the Refined Bypass System Alternative as the environmentally preferred, environmentally superior alternative, and LEDPA is based on the conclusions of the impact analysis presented in Chapter 5 and Chapter 6 of this Report. It would accomplish flood protection goals, maintain water quality, avoid the most threatened fish habitat of any alternative, meet recreational objectives, result in a slight decrease in bank armoring, and reduced impacts on riparian vegetation and SRA cover vegetation compared to the Bypass System Alternative. Although the No-Action Alternative would cause fewer direct environmental effects, it would not meet the objectives to provide 100-year flood protection to downtown San Jose, provide additional habitat for threatened fish species, or meet recreational objectives.

S.3 Issues of Known Controversy

As described in Section 1.2.3, "Status of Authorized Project," full implementation of the Authorized Project was delayed because of concerns by Federal and State regulatory agencies and nonprofit organizations about the project's effects on water temperatures and on fish species listed under the Federal ESA. The compatibility of environmental protection and recreational use of the river and river corridor has also been an issue of controversy. All project alternatives are consistent with the Guadalupe River Park Master Plan, which includes a trail system on both banks of Guadalupe River between I-280 and I-880.

Providing cost-effective flood protection infrastructure in an urban setting typically has required the use of engineered products to direct and control floodflows, which some may not regard as visually or aesthetically pleasing. All proposed alternatives minimize the amount of concrete, bank protection, channel armor, and make the flood protection components as attractive as possible.

Public scoping sessions on proposed modifications to the Authorized Project were conducted on November 9 and 17, 1999. Concerns identified during public scoping typically fell into three categories: environmental, recreational, and flood protection.

Environmental issues include public concerns about the biological effects of the project, including effects on vegetation, wildlife, and fish. Specific information was requested during the scoping process on the extent of the project's effect on these resources and

measures to prevent impacts. Because fish are dependent on a limited range of water temperatures, concerns about the project's effects on river temperature were also raised. In addition, there was concern about the hydrological and geomorphological effects of the project, such as sediment transport and potential inundation of areas behind proposed flood training walls.

Concerns about the project's effects on recreation were also raised during scoping. Most of the comments received indicated concern about the provision of adequate trails along the river, although several comments indicated concern about enhancing access to the river and potential negative impacts on wildlife. Additional concerns included (1) effects on endangered species as a result of enhanced fishing access, (2) public safety once proposed modifications to the Authorized Project are operational, and (3) effects of any instream structures on recreational boating.

Public concerns about flood protection included various issues, such as the length of time required to complete the project and noise impacts on adjacent landowners during construction. Additional areas of concern included the project's effect on the visual character of the river corridor, visual impact from the park in the Confluence East development, and the effects of ongoing maintenance on biological resources.

This Final Report reflects revisions made in response to comments received on the Draft Report during the June 23 to August 9, 2000 public review period.

S.4 Unresolved Issues

This Report describes alternative plans for modifying the Authorized Project, the potential effects of constructing flood-control features, and installing onsite and offsite mitigation, and the operational effects for the entire Guadalupe River Project. However, initiation and completion of construction, mitigation, and operational activities depends on resolution of a number of associated approvals, permits, or analyses. These include:

- State water certification under Section 401 of the CWA by the RWQCB of postproject as well as permanent postmitigation increases in temperature resulting from construction
- State water certification under Section 401 of the CWA by the RWQCB of increases in mercury resulting from construction in excess of maximum levels allowed in the regional water quality basin plan
- Environmental compliance and completion of flood protection activities associated with the lower Guadalupe River before the Guadalupe River Project becomes fully operational
- Final approvals by SCVWD's Board of Directors and Corps' Headquarters of the Proposed Action (i.e., Findings and Record of Decision, respectively) are expected by May 2001.

It is expected that these issues will be resolved during the processing of the Final Report and related approvals. The MMP includes measures and commitments to compensate for potential adverse effects. It also includes the commitment to provide adaptive management over the life of the project to ensure that mitigation objectives are met.

S.5 Relationship to Environmental Protection Statutes, Plans, and Other Requirements

This Report has been prepared in consideration of requirements of NEPA, CEQA, and other pertinent Federal, State, and local environmental regulations. NEPA requires that environmental consequences of a Proposed Action and project alternatives be considered before decision making for implementation of a Federal project. CEQA requires that environmental consequences of a Proposed Action and alternatives be considered before the approval, financing, or participation by the State of California. Section 1.5 of this Report presents the applicable environmental laws, regulations, and plans being considered and the intended uses and users of the Report. (Table 1.5-1). Environmental compliance is discussed further in Chapters 1, 5, and 6. Most of the requirements for applicable environmental laws and regulations have been met for actions addressed in this Report, and all will be complied with prior to construction of the project (Table 1.5-1). This document is not serving as public notice for any Corps permits.

S.6 Summary of Potential Environmental Effects

Detailed analysis of potential project-related environmental effects are addressed in Chapter 5, "Environmental Consequences" and summarized in Table 5.15-1. A summary of the environmental resources evaluated in this report, and the significance of project impacts to each resource is provided in Table S.6-1.

A summary of each effect and mitigation measure is presented in Table S.6-3. Detailed analysis of potential cumulative impacts of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative, in conjunction with other known past, present, and future projects are addressed in Chapter 6, "Cumulative Impacts and Other Required Analysis," and are summarized in Table 6.4-1.

S.6.1 Identification of Significant Effects

As described in Chapter 5, implementation of the Bypass System Alternative, including all mitigation measures, would not result in significant effects to any resources (Tables S.6-1 and S.6-2). Project mitigation includes implementation of the MMP and other measures identified in this Report. Table S.6-2 lists environmental resources analyzed in this report, and the determined significance of project impacts to each resource.

S.6.2 Responsibilities for MMP Implementation

The Corps and SCVWD will be responsible for providing mitigation program design, implementation, maintenance, and monitoring. The responsibilities of each will vary, depending on the mitigation area and the time when each will assume responsibility. The responsibilities are identified in Table S.6-3, and also in the MMP Tables 4-14 through 4-17 (Appendix 3). The proposed monitoring frequency is shown in the MMP Table 4-18 (Appendix 3). Protection of mitigation sites is discussed in Section 3.4.3.2, "Measures to Compensate for Adverse Project Effects," in the subsection titled "Protection of the Project's Compensatory Mitigation Sites."

TABLE S.6-1. Potential Postmitigation Effects and Determination of Significance
Effects of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative, on environmental resources after environmental commitments/mitigation. Chapter 5 provides details on project effects and the environmental commitments/mitigation.

Environmental Resource	Potential Effects		
	Bypass System Alternative with Mitigation	**Refined Bypass System Alternative with Mitigation**	**No-Action Alternative with Mitigation**
5.1 Hydrology and Hydraulics			
Flooding	B	B	S
Flow Velocity	LS	LS	N
5.2 River Geomorphology			
Channel Erosion and Deposition	LS	LS	N
River Morphology	LS	LS	LS
5.3 Water Quality			
Suspended solids and biostimulatory nutrients			
– Construction	N	N	LS
– Operation	LS	LS	n/a
Toxic constituents			
– Accidental spills of construction-related materials	N	N	N
– Mercury	LS	LS	LS
Temperature	LS	LS	LS
Dissolved Oxygen	LS	LS	LS
5.4 Biological Resources – Vegetation			
Riparian vegetation	LS	LS	LS
Shaded riverine aquatic cover vegetation	LS	LS	LS
Wetlands	N	N	N
Waters of the United States	LS	LS	LS
Upland or ruderal vegetation	N	N	N
Special-status plants	N	N	N
Recreation effect on wildlife	LS	LS	LS
Special-Status wildlife species	N	N	N
Adult and juvenile anadromous fish migration			

S = significant adverse effect; LS = less than significant adverse effect; N = no effect; B = beneficial effect; n/a not applicable

TABLE S.6-1. (Continued)

Environmental Resource	Potential Effects		
	Bypass System Alternative with Mitigation	**Refined Bypass System Alternative with Mitigation**	**No-Action Alternative with Mitigation**
Hydrologic and hydraulic conditions			
– Stranding	LS	LS	LS
– Bypass velocities	LS	LS	n/a
– Channel velocities	LS	LS	n/a
– Armoring velocities	LS	LS	LS
Channel erosion and deposition	LS	LS	LS
River morphology			
– Low flow channel passage	LS	LS	N
– Removal of barriers	B	B	N
Suspended solids and toxic constituents	N	N	N
Water temperature	N	N	N
Shaded riverine aquatic cover	LS	LS	LS
Anadromous fish spawning and incubation			
– Hydrologic and hydraulic conditions	N	N	N
– Channel erosion and deposition	LS	LS	LS
– River morphology	LS	LS	LS
– Suspended solids and toxic constituents	N	N	N
– Water temperature	LS	LS	LS
Resident and anadromous fish rearing			
– Hydrologic and hydraulic conditions	N	N	N
– Channel erosion and deposition	LS	LS	LS
– River morphology	LS	LS	LS
– Suspended solids and toxic constituents	N	N	N
– Water temperature	LS	LS	LS
– Shaded riverine aquatic cover – loss of habitat	LS	LS	LS

S = significant adverse effect; LS = less than significant adverse effect; N = no effect; B = beneficial effect; n/a not applicable

TABLE S.6-1. (Continued)

Environmental Resource	Potential Effects		
	Bypass System Alternative with Mitigation	**Refined Bypass System Alternative with Mitigation**	**No-Action Alternative with Mitigation**
5.7 Land Use and Planning			
– No conflict with land uses or plan	N	N	N
5.8 Recreation, Public Access, and Visual/ Aesthetic Resources			
Recreation			
– Disturbance during construction	LS	LS	LS
– Enhance public access	B	B	N
– Disturbance during maintenance	LS	LS	LS
Boating			
– Alteration of boating opportunities	LS	LS	N
Visual resources	LS	LS	LS
5.9 Transportation and Traffic			
Roadway capacity	LS	LS	LS
Traffic circulation	LS	LS	LS
Parking	LS	LS	n/a
Railroad	LS	LS	n/a
5.10 Air Quality			
– Effects below conformity thresholds	LS	LS	LS
– Temporary increases in PM10	LS	LS	LS
5.11 Noise	LS	LS	LS
5.12 Public Service	LS	LS	N
5.13 Hazards and Hazardous Waste	LS	LS	N
5.14 Cultural Resources			
– Known resources	N	N	N
– Unknown resources	N	N	N

S = significant adverse effect; LS = less than significant adverse effect; N = no effect; B = beneficial effect; n/a not applicable

TABLE S.6-2. Potential Cumulative Effects and Determination of Significance.
Cumulative impacts are incremental impacts from each project alternative added to the individual impacts of other major projects in the Guadalupe River watershed. Projects included in the cumulative impact analysis are listed at the end of this table[a] and Chapter 6 provides details on cumulative effects and the environmental commitments mitigation.

Environmental Resource	Potential Effects		
	Bypass System Alternative with Mitigation and Other Projects	**Refined Bypass System Alternative with Mitigation and Other Projects**	**No-Action with Mitigation and Other Projects**
6.2.2 Hydrologic and Hydraulic Impacts			
Flood protection	B	B	N
Hydrologic and hydraulic impacts			
– Flow volume	LS	LS	N
Construction			
– Channel erosion and deposition	LS	LS	LS
6.2.3 River morphology	LS	LS	LS
Sediment load	LS	LS	LS
Channel form	LS	LS	n/a
Operation			
– Channel erosion and deposition	LS	LS	LS
– Sediment transport	LS	LS	LS
– Localized erosion and deposition	LS	LS	n/a
– River morphology	LS	LS	LS
Sediment load	LS	LS	n/a
Low-flow channel	LS	LS	n/a
6.2.4 Water Quality Impacts			
Construction			
– Suspended solids and biostimulatory nutrients	LS	LS	LS
– Toxic constituents			
Accidental spills	LS	LS	LS
Mercury	LS	LS	n/a
Operation			
– Suspended solids and biostimulatory nutrients	LS	LS	LS
– Toxic constituents	LS	LS	LS

S = significant adverse effect; LS = less than significant adverse effect; N = no effect; B = beneficial effect; n/a not applicable

TABLE S.6-2. (Continued)

Environmental Resource	Potential Effects		
	Bypass System Alternative with Mitigation and Other Projects	Refined Bypass System Alternative with Mitigation and Other Projects	No-Action with Mitigation and Other Projects
Water temperature	LS	LS	LS
Dissolved oxygen	LS	LS	N
6.2.5 Biological Resources – Vegetation			
Riparian vegetation	LS	LS	LS
SRA cover vegetation	LS	LS	LS
Wetlands	LS	LS	N
Alviso Slough – salt marsh and wetlands	N	N	N
Salt evaporation ponds	N	N	N
6.2.6 Biological Resources – Wildlife			
Disturbance from humans	LS	LS	LS
California red-legged frog	N	N	N
Western snowy plover	N	N	N
– Pump out salt evaporating pond A8D	B	B	B
California clapper rail	N	N	N
Salt marsh harvest mouse	N	N	N
6.2.7 Biological Resources – Fish			
Hydrologic and hydraulic effects	LS	LS	LS
Channel erosion and deposition	LS	LS	LS
Geomorphology			
– Changes in channel form that affect habitat	LS	LS	LS
– Access to additional habitat	B	B	n/a
Suspended solids and toxic constituents	LS	LS	LS
Water temperature			
– Postproject temperature	LS	LS	LS
– Postmitigation temperature	B	B	n/a
– Dissolved oxygen	LS	LS	n/a

S = significant adverse effect; LS = less than significant adverse effect; N = no effect; B = beneficial effect; n/a not applicable

TABLE S.6-2. (Continued)

Environmental Resource	Potential Effects		
	Bypass System Alternative with Mitigation and Other Projects	Refined Bypass System Alternative with Mitigation and Other Projects	No-Action with Mitigation and Other Projects
SRA cover			
– Planting SRA cover	LS	LS	LS
– Establishing Guadalupe Creek	B	B	n/a
6.2.8 Land Use and Planning			
Land use	N	N	N
6.2.9 Recreation, Public Access, and Visual Resources			
Recreation	LS	LS	LS
Public safety	LS	LS	LS
Boating	LS	LS	LS
Visual resources	LS	LS	LS
6.2.10 Transportation and Traffic			
Roadway capacity			
– Overlap at construction	LS	LS	LS
– Long term effects	LS	LS	n/a
6.2.11 Air Quality			
Construction	LS	LS	LS
Operation	N	N	N
6.2.12 Noise			
Construction	LS	LS	LS
6.2.13 Hazards and Hazardous Materials	LS	LS	LS
6.2.14 Cultural Resources	LS	LS	LS

S = significant adverse effect; LS = less than significant adverse effect; N = no effect; B = beneficial effect; n/a not applicable

[a] Eighteen major projects in the Guadalupe River watershed are analyzed in the cumulative impact analysis (Section 6.2.1): Guadalupe River Park Project, State Route 87 Freeway Upgrade Project, State Route 85 Transportation Corridor Project, San Jose International Airport Expansion Plan, Santa Clara Valley Water District Fish Ladder Construction Program, Guadalupe Creek Restoration Project, Upper Guadalupe River Flood Control Project, Lower Guadalupe River Flood Protection Project, Stormwater Pump Installations, Virginia Street Bank Stabilization Project, Santa Clara Valley Water District Stream Maintenance Program, Alviso Ring Levee Mitigation and Restoration Project, Almaden Quicksilver County Park Project, Boston Property Project, John P. McEnery Park Site Improvements, Los Gatos Creek Trial Project, Vasona Light Rail Extension Project, and Core Location Project.

The Corps will be responsible for the design, implementation including growing or collecting site-specific plant propagules, and short-term maintenance and monitoring during construction and years 1-3 postconstruction of all mitigation areas, except the Guadalupe Creek mitigation area. SCVWD has responsibility for the design, implementation including growing or collecting site-specific plant propagules, maintenance, and monitoring of the Guadalupe Creek mitigation area; the Corps will review and approve any federally funded portions and specify their maintenance requirements. Additionally, the Corps is responsible for annual reporting of the short-term (3-year) monitoring results to the Adaptive Management Team for all mitigation areas. After the end of short-term maintenance and monitoring, the Corps will turn over all mitigation areas to SCVWD for long-term maintenance and monitoring and annual reporting (years 4-100). Monitoring will continue for the life of the project, subject to the Adaptive Management Team's continuing oversight, or until the Adaptive Management Team has determined that the measurable objectives have been attained. The Corps (years 1-3) and SCVWD (years 4-100) will be responsible for planning for the potential implementation of remedial actions so that their implementation is not delayed if the Adaptive Management Team determines that an action is necessary. This planning effort will be completed prior to the start of construction in Segments 3A and 3B.

If long-term monitoring reveals that a mitigation action is not meeting its stated objective and is adversely affecting listed species as a result of the Proposed Action, then the Corps, with USFWS and NMFS, will reinitiate consultation to pursue remedial action.

S.7 Summary of Benefits and Costs of the Proposed Action

Implementation of the Guadalupe River Project with the Proposed Action will result in many benefits. Implementation will reduce periodic flooding, provide 100-year flood protection, and minimize associated adverse effects and costs. It will increase recreational opportunities by increasing public access to the river and providing open space, picnic facilities, trail connections, viewing locations, and opportunities for public education. It will also minimize riverbank erosion and associated accumulation of instream sediments, potential increases in instream water temperatures, and potential losses in important aquatic and riparian wildlife habitat.

The cost of implementing the Proposed Action, including construction and placement of project structures and facilities and annualized costs, is estimated to be $151.6 million for remaining project elements. If the Proposed Action is approved, then the adjusted total cost for the Modified Authorized Project would be an estimated $226.8 million. Associated annualized costs, including operation and maintenance, are $13.9 million. Costs specific to implementation of preventive and mitigation measures to avoid and minimize potential adverse effects on riparian vegetation, including SRA cover, and aquatic resources during construction of the Proposed Action, are estimated to be approximately $10.6 million. Based on current laws and regulations, Corps participation in cost sharing is limited to the Federal share of the NED Plan. Accordingly, the estimated cost apportionment between the Corps and SCVWD is 57 percent and 43 percent, respectively.

Economic benefits associated with implementation of the Proposed Action derive from reduced flood damage ($22.4 million), reduced flood insurance administration costs ($0.2

million), and recreation ($3.0 million). The benefit-to-cost ratio for the Proposed Action is 1.85:1. Detailed information on benefits and costs associated with implementation of the Proposed Action is provided in Chapter 8, "Recommended Plan and Implementation Requirements."

TABLE S.6-3. Summary of Key Potential Project Effects, Proposed Mitigation Measures and Related Indicators, Measurable Objectives, and Remedial Actions to Assure Mitigation Success for the Guadalupe River Project with the Proposed Action

Potential Effect	Mitigation Measures	Indicators and Measurable Objectives [a]	Examples of Potential Remedial Actions
Loss of 14.12 acres of riparian vegetation	Plant 21.0 acres of riparian vegetation	Survival: 100 trees and 70 shrubs per acre; survival counts may be replaced by cover measurements if counts are impractical because of natural regeneration	Replant appropriate species at the mitigation site or alternative location
		Health and vigor: average rating for foliage, wood and root crown for each plant in sample must exceed "fair" (score > 2)	Revise irrigation regime, treat diseases, amend soil, or deter pest damage
		Natural recruitment: evidence of natural recruitment of native riparian tree and shrub species	Develop and implement actions to facilitate natural recruitment
		Cover: approximately 75 percent cover for native trees and 45 percent cover for native shrubs; variable percentages but total cover no less than 85 percent	Initiate an irrigation regime, add soil amendments, plant additional appropriate species
		Nonnative species: cover by giant reed should be <5 percent; cover by other nonnative woody species should be <15 percent	Physically and chemically remove noxious woody nonnative species and introduced species
		Tree height: 30-60 feet depending on the species	
		Tree basal area: typical for a riparian forest at the site and increasing over time	Initiate an irrigation regime, add soil amendments, plant additional appropriate species
Loss of 8,387 lf of shaded riverine aquatic (SRA) cover	Plant 22,892 lf (SRA) with riparian vegetation; Onsite Contracts 1-3 = 2,590 lf; Woz Way to Park Ave. Bypass Reach = 410 lf; Reach A = 7,848 lf; and lower Guadalupe Creek = 12,044 lf[b]	Survival: 17 trees and 10 shrubs per 100 lf; survival counts may be replaced by cover measurements if counts are impractical because of natural regeneration	Replant appropriate species at the mitigation site or alternative location
		Health and vigor: average rating for foliage, wood and root crown for each plant in sample must exceed "fair" (score > 2)	Revise irrigation regime, treat diseases, amend soil, or deter pest damage
		Natural recruitment: evidence of natural recruitment of native riparian tree and shrub species	Develop and implement actions to facilitate natural recruitment
		Nonnative species: cover by giant reed should be <5 percent; cover by other nonnative woody species should be <15 percent	Physically and chemically remove noxious woody nonnative species and introduced species
		Shaded stream surface: 45 percent of the total stream surface area is shaded at normal summer flow, at least 85 percent of the planted bank length has some shade	Initiate an irrigation regime, add soil amendments, plant additional appropriate species
		Bank stability: stable ground cover along 75 percent of the affected stream length	Plant additional riparian vegetation, or implement biotechnical bank stabilization

TABLE S.6-3. (Continued)

Potential Effect	Mitigation Measures	Indicators and Measurable Objectives [a]	Examples of Potential Remedial Actions
		Instream cover: 10 percent of total stream area at depths greater than 15 cm at normal summer flow	Place boulders, woody material, or other structures in the channel
		Channel Bed Stability: Maintain channel bed elevation within ±0.5 feet of previous survey	Stabilize channel with permanent structural changes
Increase in summer water temperatures	Plant riparian vegetation, construct low-flow channel	Monthly thermal suitability: monthly thermal suitability units for steelhead and chinook salmon equal to or greater than preproject levels	Plant additional riparian vegetation, modify channel to increase water depth, augment flow with cool water
		Short-term thermal suitability: monthly median hourly water temperature must provide a suitability index for steelhead and chinook salmon life stages greater than 0.5 in at least 50 percent of the project area	Plant additional riparian vegetation, increase water depth, provide temporary shade, augment flow with cool water
24,850 sf of anadromous fish spawning habitat	Replace and maintain spawning habitat	Spawning gravel abundance: spawning gravel abundance greater than or equal to preproject levels	Add gravel to spawning areas, place boulders and weirs to retain gravel, place gravel upstream to supply the project area
		Spawning gravel quality: spawning gravel quality greater than or equal to preproject levels	Add gravel to spawning areas, reduce input of fine sediment, remove fine sediment
4,433 feet of armored river channel, affecting fish passage and rearing habitat	Construct low-flow channel, invert stabilization features, and bank stabilization features	Depth and velocity: water depth >1 foot at flows >4 cfs; velocity <5 feet per second when flow is within the capacity of the low flow channel	Remove the cause of high velocity or shallow depth, such as sediment or debris removal; alter channel geometry
		Vertical barriers: Vertical barriers must allow upstream migration of anadromous fish	Remove barriers, construct fish passage facilities
		Rearing habitat diversity: occurrence and length of rearing habitat within 10 percent of preproject values	Place boulders or other structures in the channel
Effects on habitat conditions may reduce anadromous fish abundance	Replace and maintain habitat values for anadromous fish	Adult Migration and Spawning: anadromous fish migration and spawning consistent with preproject levels and environmental conditions not affected by the Guadalupe River Project	Add gravel to spawning areas, remove migration barriers
		Juvenile rearing: steelhead rearing distribution and abundance consistent with preproject levels and environmental conditions not affected by the Guadalupe River Project	Plant additional riparian vegetation; place boulders, woody material, or other structures in the channel
		Juvenile migration: anadromous fish outmigration timing and abundance consistent with preproject levels and environmental conditions not affected by the Guadalupe River Project	Plant additional riparian vegetation; place boulders, woody material, or other structures in the channel

TABLE S.6-3. (Continued)

Potential Effect	Mitigation Measures	Indicators and Measurable Objectives [a]	Examples of Potential Remedial Actions
Potential for changes in the locations and rates of methyl mercury formation	Corps and SCVWD will monitor methyl mercury concentrations in Segments 1, 2, and 3 and Reach A. SCVWD will participate with the RWQCB for the San Francisco Bay Region in assessing mercury transport in the Guadalupe River and the potential for methylation associated with proposed wetland and riparian mitigation	Indicators for the assessment of mercury transport and the potential for methylation of mercury will include total suspended solids, total and bioavailable mercury, and methyl mercury concentrations in riverbed and suspended sediments. Specific measurable objectives will be developed by the RWQCB in coordination with SCVWD.	Corps and SCVWD will consult with RWQCB to identify and implement additional measures to reduce controllable factors responsible for elevations in methyl mercury concentrations. SCVWD will continue to participate with the RWQCB in assessing mercury transport in the Guadalupe River and the potential for methylation associated with proposed wetland and riparian mitigation.

[a] See text and Table 4-18 of the Mitigation Monitoring Plan for time requirements relative to meeting the measurable objectives.

[b] Total SRA mitigation for the Guadalupe River Project with Bypass System Alternative, based on the HEP analysis, would equal 18,026 lf. Guadalupe Creek, between Masson Dam and Almaden Expressway, would be planted with an estimated 12,044 lf of SRA cover vegetation. A total of 7,217 lf of SRA cover vegetation mitigation on Guadalupe Creek would serve as mitigation for the Guadalupe River Project with Bypass System Alternative. Phase 2 plantings on Guadalupe Creek would provide an estimated 5,971 lf of SRA cover vegetation mitigation to be applied to the Guadalupe River Project with Bypass System Alternative. Excess SRA cover vegetation mitigation credits on Guadalupe Creek would be used by SCVWD to mitigate for other projects.

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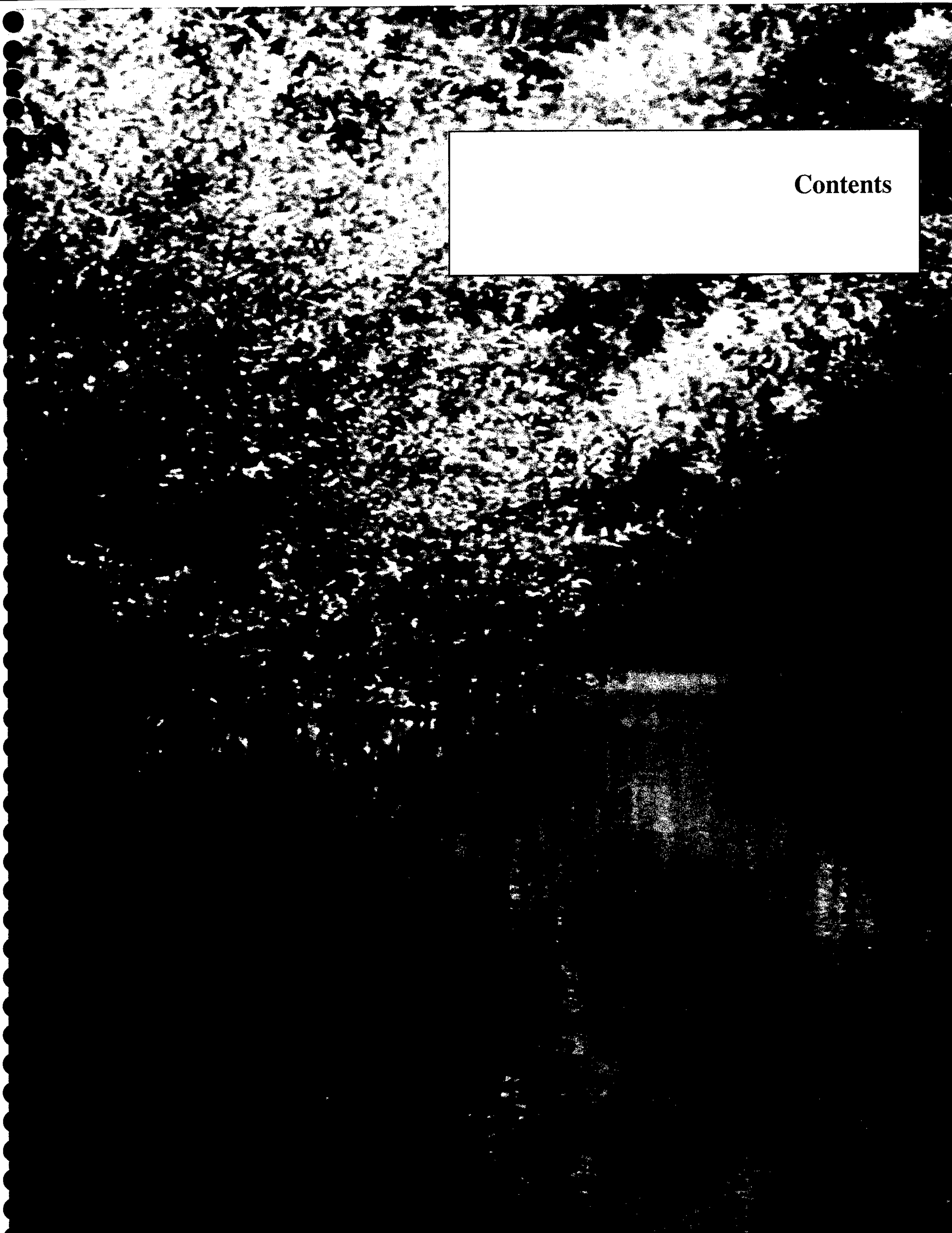


Contents – Volume 1

Volume 1 of this document consists of 11 chapters. Chapters 1-7 and 9-11 provide information that meets the requirements of National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and the General Re-Evaluation Report (GRR) planning process. Chapter 8 is specific to Corps GRR requirements.

Chapter

Chapter 1

Tables

Figures

Note: Figure 8.2-1 (at the end of Chapter 8) shows the Proposed Action and can be viewed as a foldout for reference while reading other Sections of the Report

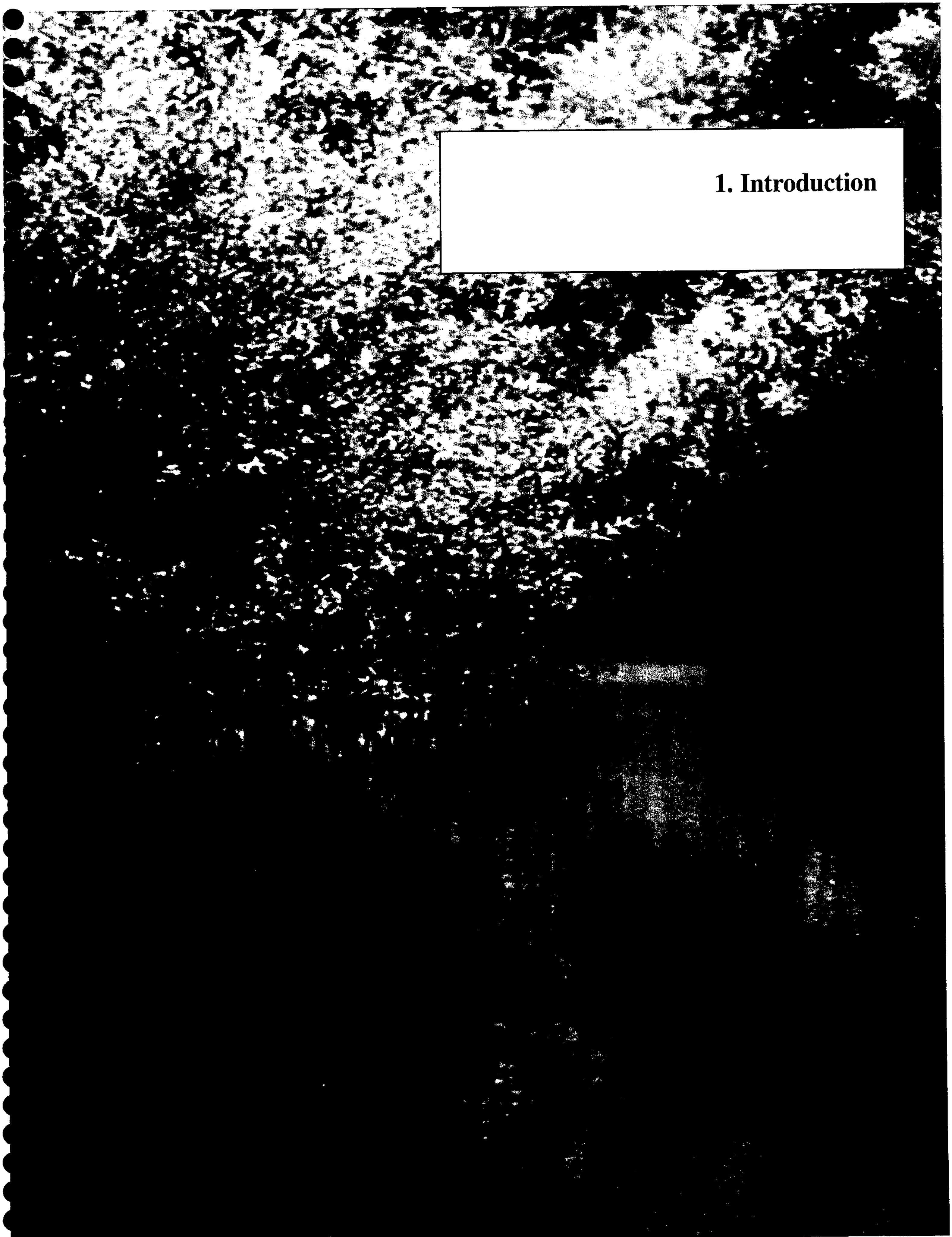
Appendices (Provided in Volume 2A)

Appendix 1: Environmental

Appendices (Provided in Volume 2B)

Volume 3 is not included in the Report for public distribution. It is intended solely for the use of the Corps of Engineers and the SCVWD. Copies of Volume 3 are on file at the Corps of Engineers and SCVWD offices indicated in the Abstract on page A-1 and are available on request.

1. Introduction



KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions:

The Refined Bypass System Alternative is now identified as the Proposed Action alternative. This change was made after the Refined Bypass System Alternative was found to be environmentally superior, environmentally preferable, and less costly during the lead agencies' review of the Draft Report (see Chapters 2, 5, and 8 for details on this revision).

Responses to public comments on the Draft Report are presented in Appendix 4 (Volume 2). Appendix 4 presents text with highlights and strikeouts showing where specific text in the Draft Report was modified in response to comments.

Chapter 3 provides additional detail on the Soil Management Plan used to test excavated soil during the construction period for constituents of concern and on the construction period Groundwater Dewatering and Treatment Plan.

Chapter 4 presents additional information on existing hazardous material areas and the condition of mercury-laden soils in the Guadalupe River watershed.

Chapter 5 presents potential environmental impacts of the No Action, Bypass System, and Refined Bypass System Alternatives. Impacts of the Bypass System and Refined Bypass System Alternative are nearly identical except that: (1) river bank armoring under the Refined Bypass System Alternative is 200 linear feet less than under the Bypass System Alternative; and (2) the related environmental effects are slightly less impact to SRA and to riparian wildlife habitat resources, but slightly more impact to recreation, public access, and visual resources due to realignment of the recreation trail.

Additional post-Draft Report modeling analyses (i.e., HEC-6 Movable Bed Numerical Modeling Analysis) were conducted to better refine the determination of potential impacts on erosion, sedimentation, and the river's geomorphology. The assessment regarding river morphology has been revised and now concludes that the proposed project would have a less-than-significant adverse effect on channel erosion downstream of the Coleman Street Bridge and on sediment deposition between Santa Clara and Coleman.

Additional detail regarding potential beneficial effects of the project on the overall reduction of mobile mercury-laden sediments in the project reach has been added to the Water Quality Section.

Additional discussions of the bypass inlet structures are presented in the Recreation, Public Access, and Visual/Aesthetic Resources Section.

Chapter 6, Cumulative Impact Analysis has been revised to consider nine other planned projects in addition to those projects previously addressed in the Draft Report, that are also likely to be constructed in the Guadalupe River watershed.

CHAPTER 1

Introduction

This Integrated General Re-Evaluation Report/ Environmental Impact Report-Supplemental Environmental Impact Statement (GRR/EIR-SEIS or Report hereafter) addresses proposed modifications to the federally authorized Guadalupe River Project in downtown San Jose, California. These modifications include flood protection, recreation, and related mitigation measures primarily along 2.6 miles of the Guadalupe River and two related offsite mitigation areas. This Report will support decision making by the U.S. Army Corps of Engineers (Corps), Santa Clara Valley Water District (SCVWD), and other responsible agencies to implement proposed project modifications and ensure compliance with the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other pertinent laws and regulations. Potential direct and indirect environmental, social, and economic effects of the Proposed Action and alternatives are evaluated, and project modifications are recommended for implementation. The Report has been prepared by the Sacramento District of the Corps and SCVWD, which are the Federal and State lead agencies, respectively.

The Guadalupe River Project is located primarily downtown in the City of San Jose (the City), immediately south of San Francisco Bay. Major tributaries of the river are Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero Creek (Figure 1.0-1). The Guadalupe River has a long history of flooding, as evidenced by the occurrence of 14 major floods since World War II. Of these, the flood of 1955 was the most extensive in recorded history, inundating 8,300 acres. Other floods on the Guadalupe River in the recent past occurred in 1980, 1982, 1986, 1995, and 1997. President Clinton declared this region a national disaster area following the floods of 1995 and 1997.

When authorized by Congress under Section 401(b) of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662), flood protection measures defining the Guadalupe River Project became an Authorized Project (U.S. Army Corps of Engineers, 1993). The Authorized Project is located between two other reaches of the river, the Upper and Lower Guadalupe River segments (Figure 1.0-2). Flood protection projects have also been initiated for these two reaches. Proposed flood protection work for the Upper Guadalupe River has been authorized under Section 101(a)(9) Water Resources Development Act of 1999 (Public Law 106-53). The Lower Guadalupe River phase is being constructed by SCVWD.

1.1 Purpose and Need for the Proposed Action

Completion of the Authorized Project (Figure 1.1-1) requires modifications to protect biological species recently listed under the Endangered Species Act (ESA), to meet conditions for water quality certification under the Clean Water Act (CWA), and to further

enhance recreational opportunities. Proposed modifications to the Authorized Project include the construction and operation of an underground bypass to convey floodwaters around important riparian habitat, expanded onsite and offsite mitigation, and modification of structures in the river to accomplish habitat and recreation goals.

The primary purpose of the Guadalupe River Project is to provide improved flood protection for downtown San Jose by modifying and completing the Authorized Project, consistent with requirements for protecting the environmental quality of the Guadalupe River. A secondary but important purpose is to provide recreational access to the Guadalupe River.

1.2 Background

1.2.1 Authorizations

The Guadalupe River Project, as authorized by Congress in 1986, was primarily a single-purpose flood protection project that included an underground bypass conduit (currently called the Woz Way to Park Avenue bypass reach), and a combination of channel widening and bank and invert lining with concrete and riprap. The project also included a wildlife mitigation plan to replace the riparian habitat lost as a result of implementation of the flood protection elements.

As the design of the Authorized Project proceeded, it became necessary to modify the project to more fully achieve habitat protection and recreational goals. In 1990, the Corps assessed the need for modifications to the original project to consider changes to the riparian mitigation plan; evaluation of potential impacts on anadromous fish from the project; evaluation of potential impacts related to the evaluation of hazardous and toxic materials and their disposal; and the expansion of the project impact area and the effect of that expansion on fish and wildlife, water quality, recreation, streamflow, cultural resources, and vegetation. The 1986 authorization was amended by the Energy and Water Development Appropriations Act for Fiscal Year 1990 (Public Law 101-101) for purposes of providing additional funding to achieve recreational and habitat protection goals.

During this same time period, the City was preparing the Guadalupe River Park Plan. Implementation of the Authorized Project would have fenced portions of the project area and restricted public access to the Guadalupe River. Because restricted public access and fencing were not compatible with the recreation plan, the Corps explored further modifications to the Authorized Project design to be aesthetically compatible with park developments and public uses. These modifications to the Authorized Project did not require additional congressional approvals, because the main purpose of the Authorized Project—to provide flood protection—did not change.

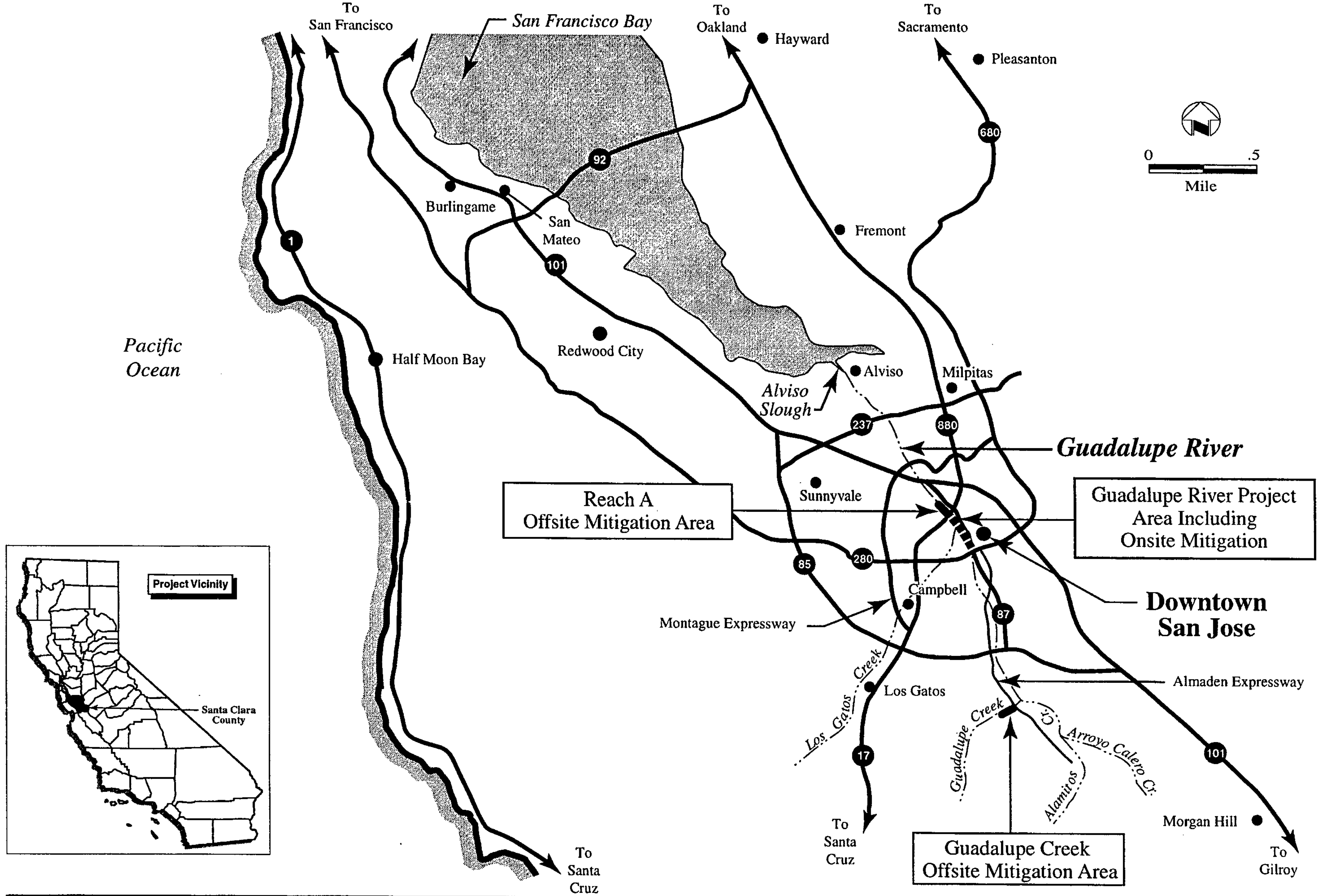


Figure 1.0-1. Guadalupe River Project Vicinity Map

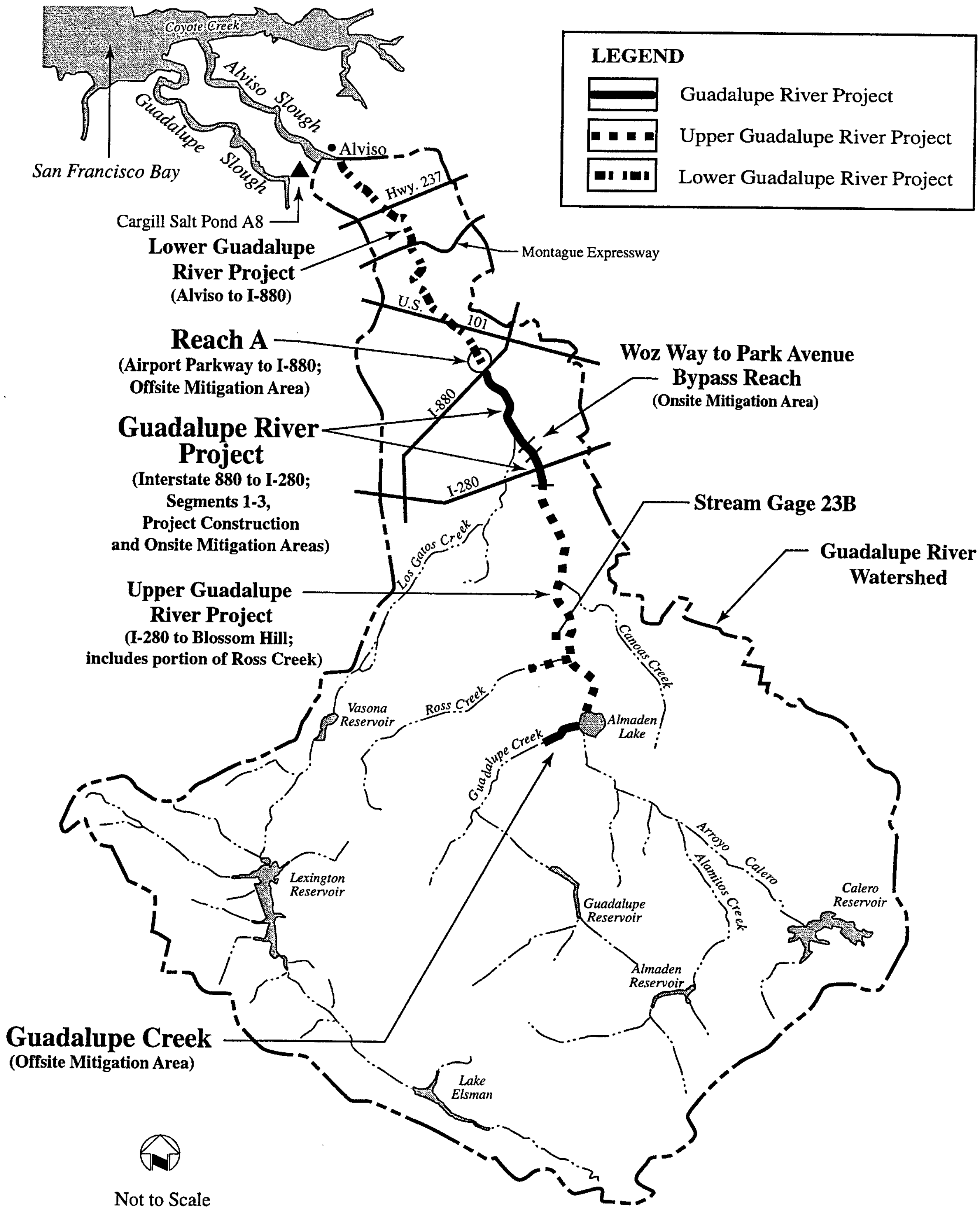
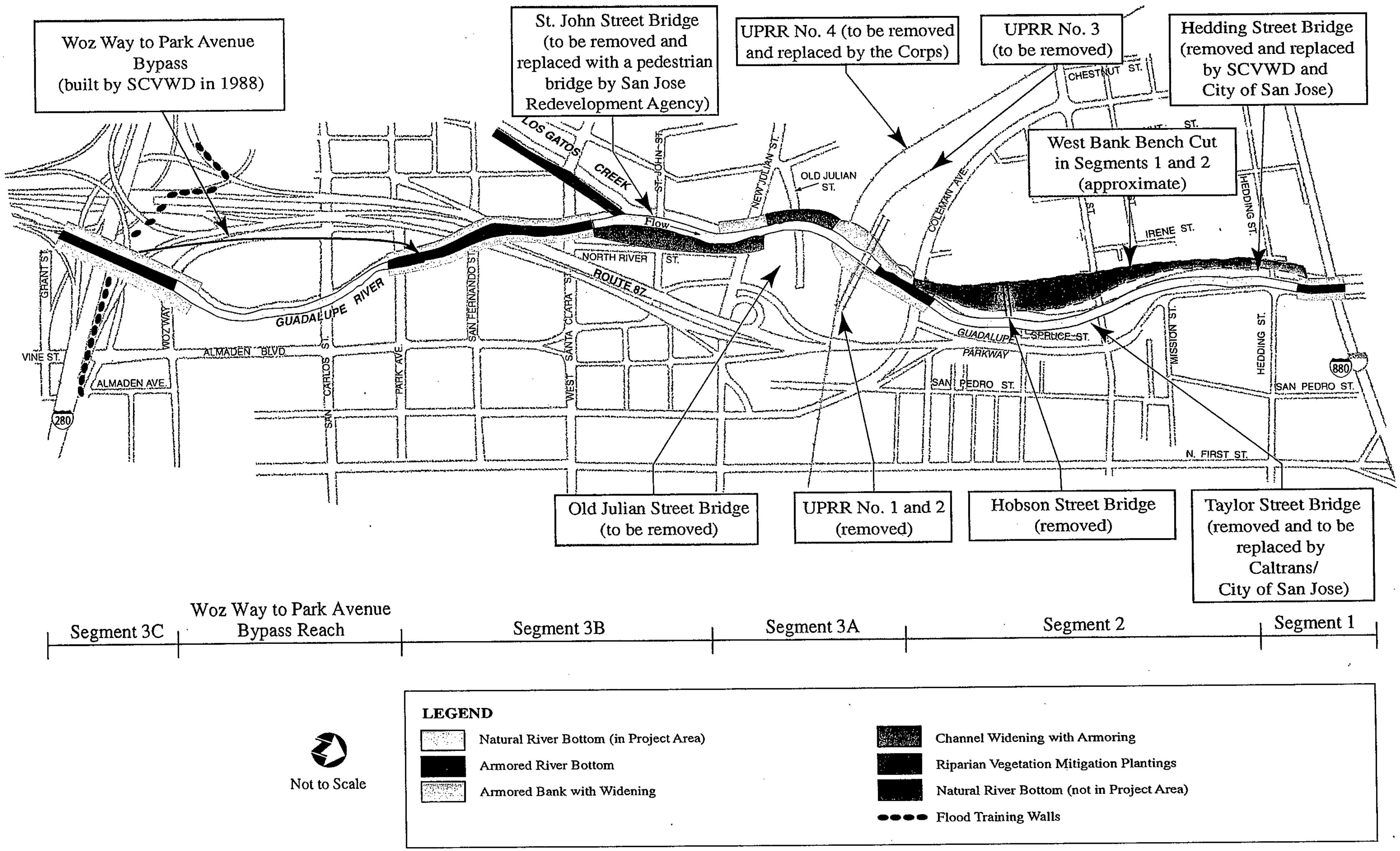


Figure 1.0-2. Guadalupe River Watershed Including Project Construction and Mitigation Areas



Revised

Figure 1.1-1. Guadalupe River Authorized Project (1992) Flood Protection and Onsite Mitigation Components

In 1991, the General Design Memorandum (GDM) presented the results of various studies, including the supporting environmental documentation for the 1990 and 1991 project modifications, and determined the most complete and acceptable solution to flooding along the Guadalupe River. It described the factors leading to the Authorized Project and served as the basis for preparation of final plans and specifications for construction (U.S. Army Corps of Engineers, 1993).

As part of the environmental clearances associated with the Authorized Project, Section 401 of CWA required the Corps to obtain water quality certification prior to construction. The State Water Resources Control Board (SWRCB) is responsible for implementing Section 401. The SWRCB expressed two primary concerns as a result of post-1986 design modifications to the project: (1) the need to summarize impacts on riparian resources and specify protective measures and (2) the need to incorporate fishery mitigation measures in a final Mitigation Monitoring Plan (MMP). The SWRCB issued a conditional water quality certification in February 1991. Required components of the final MMP included a summary of effects on wetland, riparian, and fish habitat; a compensatory riparian mitigation plan; a vegetation protection plan; an erosion control plan; and a fisheries mitigation plan. A version of the MMP acceptable to the SWRCB was prepared in 1992.

1.2.2 Description of Authorized Project

The Authorized Project, as modified in 1990 and 1991, provided for flood protection and included recreational elements of the local Guadalupe River Park Plan. Project plans provided for the construction of flood protection elements along the 2.6-mile downtown reach in several phases, or segments.

- Segment 1, the most downstream reach, is between I-880 and Hedding Street. This reach included an overflow area with a planting bench and armoring on the eastern and western banks and portions of the invert channel near I-880.
- Segment 2 is located between Hedding Street and Coleman Avenue. This reach also included an overflow area with a planting bench and armoring on the eastern and western banks and portions of the channel bed downstream from the Coleman Avenue Bridge.
- Segment 3 is between Coleman Avenue and Park Avenue and between Woz Way and Grant Street, including the area of the Guadalupe River under the I-280/State Route 87 interchange. This reach is broken into three subreaches called Segment 3A, Segment 3B, and Segment 3C (Figure 1.1-1).

The Segment 3A subreach is between Coleman Avenue and New Julian Street. Planned improvements in this subreach included widening of the eastern bank, armoring on the western and eastern banks, and armoring in the channel bed from Coleman Avenue to the Union Pacific Railroad (UPRR) No. 4 Bridge. Segment 3B is located between New Julian Street and Park Avenue. Planned improvements in this subreach included widening the eastern bank and installing armoring near the confluence of Los Gatos Creek and the New Julian Street and Santa Clara Street bridge crossings. From Santa Clara Street to Park Avenue, the Authorized Project planned to construct retaining walls and armoring along the eastern and western banks and the channel bed. A box culvert outlet structure north of Park Avenue was also included, to connect with another existing bypass box culvert. Segment 3C is in the most upstream limit of the downtown reach. Improvements in this

subreach included widening of the river channel and armoring the eastern and western banks and the channel bed from the Woz Way Bridge to Grant Avenue. Other components along all three subreaches include a pedestrian walkway along the river, maintenance access, and general landscaping.

In general, the Authorized Project also included constructing vertical concrete retaining walls with gabion and concrete terraces on sideslopes along all segments noted above. The Authorized Project, as modified in 1991, also retained some riparian vegetation and maximized the retention of cultural resources.

1.2.3 Status of Authorized Project

Project construction was initiated in 1992 based on the Authorized Project as described in the 1991 GDM and the associated 1992 MMP. Segment 1 was constructed between 1992 and 1994, and Segment 2 was constructed between 1994 and 1996. Required mitigation for Segment 1 and Segment 2 was also initiated during this time. In May 1996, further construction was delayed in response to threatened litigation alleging that the Corps and SCVWD implemented the Authorized Project in violation of conditional water quality certification requirements relating to water temperature. State and Federal resource agencies also were not completely satisfied with planned mitigation because of growing uncertainty over the adequacy of compensation for lost riparian habitat and associated impacts on anadromous fish spawning habitat. In addition, species with the potential to occur in the project area had recently become listed or were proposed for listing (Central California Coast steelhead and fall-run chinook salmon) under the Federal Endangered Species Act (ESA). These considerations resulted in a cessation of construction activities along the downtown reach in 1996 and prompted the reexamination of the Authorized Project's overall design and the need for modification of the MMP.

In 1997, staff from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and SWRCB met with the Corps and SCVWD about the Authorized Project and the MMP. The following project modifications were recommended by resource agencies at that time:

- Redesign the Authorized Project to avoid impacts and maximize onsite mitigation.
- Maximize onsite revegetation to replace impacted Shaded Riverine Aquatic (SRA) cover.
- Provide offsite mitigation to replace impacted SRA cover.
- Provide fisheries mitigation.
- Provide water temperature (thermal) mitigation.

In 1998, the Corps and SCVWD committed to reformulate the Segment 3A and 3B reaches and to avoid impacting existing SRA cover habitat. Since then, the Corps and SCVWD have been refining objectives and alternatives in coordination with the concerned regulatory agencies, as well as the Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Association, and Trout Unlimited (as represented by the Natural Heritage Institute [NHI]). Given that it appeared, at this time, that complete reformulation of Segment 3C under the Authorized Project would not be necessary, all involved agencies concluded that construction activities within this subreach could be resumed in October 1999.

1.2.4 Objectives of Further Modifications to the Authorized Project

The following planning, design, construction, and environmental objectives provided the basis for modifications to complete the Authorized Project.

- Proposed project modifications should provide flood protection from the Guadalupe River in downtown San Jose during the 100-year flood event consistent with the intent of the Authorized Project.
- Avoid adverse impacts on fish and wildlife habitat to the maximum extent practicable using opportunities associated with potential refinements in design, mitigation measures, and implementation techniques for the flood protection project, with special emphasis on protection of the remnant steelhead trout.
- Provide recreation elements compatible with local recreation plans and the 1991 GDM. Be consistent with redevelopment plans adjacent to the Guadalupe River in downtown San Jose through integration with the Guadalupe River Park and Gardens Master Plan and downtown redevelopment plans, with maximum preservation of historic and cultural resources.
- Provide for a minimum flow of 1,500 cubic feet per second (cfs) in the natural channel throughout the bypass reach during flood events to accommodate fish and wildlife concerns.
- Refine modifications to the Authorized Project to allow for the successful migration of anadromous fish through the project's portion of the Guadalupe River, including reaches with armored channel bed.
- Design modifications to the Authorized Project so that they will not cause elevated water temperature that harm anadromous fish species during construction, operation and maintenance of the project, including the transition period before replacement vegetation matures.
- Provide for fish passage in the armored reaches.
- Comply with a Section 1600 of the California Fish and Game Code (Lake or Streambed Alteration Agreement), required for projects proposing any activity that will divert or obstruct the natural flow or change the bed, channel, or bank of any river, stream, or lake.
- Replace the amount, quality, and value of riparian habitat removed as a result of project construction or operation by establishing 21 acres of riparian habitat (Appendix 3).
- Replace the amount, quality, and value of SRA cover removed during project construction by establishing 22,892 linear feet (lf) of SRA cover onsite and offsite along the river and important tributaries (Appendix 3).
- Replace and maintain, for the life of the entire project, approximately 25,000 sf of spawning gravels removed during project construction (Appendix 3).
- Replace the amount, quality, and value of anadromous fish habitat, including spawning and rearing habitat.

1.3 Scope and Intent of the Report

1.3.1 Scope

This Report describes the recommended project modifications, alternative plans, and potential construction-related effects for Segment 3A, Segment 3B, and portions of Segment 3C (known as Phase 3), onsite and offsite mitigation, and the operational and maintenance effects for the entire Guadalupe River Project. (Chapter 5) It does not address the construction-related effects of Segment 1, Segment 2, and Segment 3C, Phase 1 and Phase 2. These phases were addressed in previous environmental documents as described in Section 1.6, "Other Pertinent Studies and Documents."

The study area for issues evaluated in this Report includes two areas along the Guadalupe River and one area along Guadalupe Creek in Santa Clara County, California. Segments 3A and 3B extend for approximately 2.6 miles through downtown San Jose and include the Guadalupe River, the riverbanks, and land adjacent to the east levee from the West Santa Clara Street vicinity to the north side of Coleman Avenue.

The offsite mitigation areas include portions of the lower Guadalupe River between Airport Parkway and I-880, also referred to as the Reach A mitigation site, and the Guadalupe Creek mitigation site, 660 feet downstream from Masson Dam to the Almaden Expressway. (Figure 1.0-2) Guadalupe Creek is part of the headwaters of the Guadalupe River and is approximately 4 miles upstream from Segments 3A and 3B. The offsite mitigation study areas do not include land outside the riverbanks.

1.3.2 Intent

The intent of this Report is to disclose and guide mitigation for the potential environmental effects associated with the modifications required to protect biological species, to meet conditions for water quality certification, and to further enhance recreational opportunities. Modifications to the Authorized Project currently include the construction and operation of an underground bypass to convey floodwaters around important riparian habitat, expanded onsite and offsite mitigation, and modification of structures in the river to accomplish fishery habitat and recreation goals. Operational effects are the anticipated effects of conveying floodflows through newly constructed facilities and mitigation areas.

This Report was prepared as an integrated document by the Corps and SCVWD. The Corps and SCVWD will use the document to comply with the requirements of NEPA and CEQA. The Corps will also use the document to summarize revised benefits, costs, and other implementation requirements associated with modifications to the Authorized Project. This summary (GRR) will serve as documentation to obtain approval and funding for project elements currently required to comply with the ESA and the CWA that were unanticipated in 1986, when the Authorized Project was funded.

This Report was also prepared to assist:

- The City, including the Redevelopment Agency, Parks and Recreation Department, Public Works Department, and Environmental Services Department in coordinating park plan implementation and evaluating other activities in the floodway

- SWRCB and San Francisco Bay Regional Water Quality Control Board (RWQCB) in verifying that the proposed modifications to the Authorized Project will fulfill a conditional requirement for water quality certification under Section 104 of the CWA
- USFWS and NMFS in determining if mitigation fulfills requirements stipulated in the ESA and the Fish and Wildlife Coordination Act and in verifying that modifications to the Authorized Project are adequate and consistent with objectives and agreements of the Collaborative forum for dispute resolution
- CDFG in determining if mitigation fulfills requirements in the Fish and Game Code and in verifying that modifications to the Authorized Project are acceptable
- The Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited (as represented by NHI) in verifying that modifications to the Authorized Project are acceptable
- The public in understanding the rationale for the project modifications and the potential environmental effects associated with the project

1.4 Issues of Known Controversy

1.4.1 Public Scoping

Public scoping sessions on proposed modifications to the Authorized Project were conducted on November 9 and 17, 1999. Concerns identified during public scoping fell into three main categories: environmental, recreational, and flood protection.

Environmental issues included public concerns about the biological effects of the project, including effects on vegetation, wildlife, and fish. Specific information was requested during the scoping process on the extent of the project's effects on these resources and measures to prevent these effects. Because fish are dependent on a limited range of water temperatures, concerns about the project's effects on river temperature were also raised. In addition, there was concern about the hydrological and geomorphological effects of the project, such as sediment transport and potential inundation of new areas behind the flood training walls.

Concerns about the project's effects on recreation were also raised during scoping. Most of the comments received indicated concern about the provision of adequate access and trails along the river, while others indicated concern about enhancing access to the river and potential negative impacts on wildlife. Additional concerns included effects on endangered species as a result of enhanced fishing access and boating, as well as public safety once proposed modifications to the Authorized Project are operational.

Public concerns about flood protection included various issues, such as the length of time required to complete the project, noise impacts on adjacent landowners during construction, and the potential for the flood training walls to induce flooding in other areas. Additional areas of concern included the project's effect on the visual character of the river corridor and the effects of ongoing maintenance on biological resources.

1.4.2 Agencies, Nonprofit Organizations, Corps and Santa Clara Valley Water District

As described in Section 1.2.3, "Status of Authorized Project," full implementation of the Authorized Project was delayed because of concerns by governmental agencies and nonprofit organizations about the project's effects on water temperatures and on species listed as threatened or endangered under the ESA. Recreational use of the river and river corridor is also an issue of known controversy. The Corps and SCVWD have taken and continue to take steps to ensure that the project provides for both public access and environmental protection. See Section 3.4.2.8, "Public Access" and Section 3.4.3, "Environmental Commitments" for further discussion of these issues.

The Corps and SCVWD also recognize that the goal of providing flood protection is contentious. Flood protection infrastructure in an urban setting requires the use of concrete, rock bank protection, and/or other engineered products to direct and control floodflows, which some may not regard as visually or aesthetically pleasing. The Corps and SCVWD's current plans and modifications seek to minimize the amount of concrete channelization and to make the flood protection components as attractive as possible.

1.4.3 Unresolved Issues

This Report describes the construction-related effects of modifications to the Authorized Project, associated onsite and offsite mitigation, and the operational effects of the entire Guadalupe River Project. However, initiation and completion of construction, mitigation, and operational activities depend on resolution of a number of associated approvals, permits, or analyses. These include:

- State water quality certification by the San Francisco Bay RWQCB under Section 401 of the CWA
- Approval by the San Francisco Bay RWQCB of temporary and short-term increases during construction in temperature in excess of maximum levels allowed in the Regional Water Quality Basin Plan
- The Lower Guadalupe River Project must complete its environmental compliance and construct all flood protection elements associated with the Lower Guadalupe River Project before the Guadalupe River Project becomes fully operational, as described under the Proposed Action
- Reconciliation of final comments received from concerned agencies and the public after review of the Draft Report
- Final approvals by SCVWD's Board of Directors and Corps' Headquarters of the Proposed Action (i.e., Findings and Record of Decision, respectively). These approvals are expected in 2001.

It is expected that these issues will be resolved during the processing of the Final Report and related approvals. The MMP includes measures and commitments to compensate for potential adverse effects. It also includes the commitment to provide adaptive management over the life of the project to ensure that mitigation objectives are met.

1.5 Consultation and Other Requirements

The Guadalupe River Project must fulfill Federal, State, regional, and local environmental requirements as described below and summarized in Table 1.5-1. Construction and operation of the Guadalupe River Project will be in compliance with the requirements described below, as well as the requirements in the Mitigation and Monitoring Plan (Volume 2, Appendix 3).

1.5.1 Federal Requirements

1.5.1.1 National Environmental Policy Act

The National Environmental Policy Act, 42 USC 4321; 40 CFR 1500.1, is the Nation's broadest environmental law. NEPA applies to all Federal agencies and most of the activities they manage, regulate, or fund that affect the environment. It requires all agencies to disclose and consider the environmental implications of their Proposed Actions. NEPA establishes environmental policies for the Nation, provides an interdisciplinary framework for Federal agencies to prevent environmental damage, and contains "action-forcing" procedures to ensure that Federal agency decision makers take environmental factors into account.

NEPA requires the preparation of an appropriate document to ensure that Federal agencies accomplish the law's purposes. The President's Council on Environmental Quality (CEQ) has adopted regulations and other guidance that provides detailed procedures that Federal agencies must follow to implement NEPA. The Corps will use this SEIS to comply with CEQ's regulations and document NEPA compliance. A supplemental EIS is being prepared because the Authorized Project has been substantially modified and there are new circumstances and information relevant to the environmental concerns previously identified.

1.5.1.2 Endangered Species Act

Section 7 of the ESA of 1973, as amended (16 USC 1531), requires Federal agencies to consult with the Secretary of the Interior (USFWS) and the Secretary of Commerce (NMFS) to ensure that agency actions do not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify critical habitat that supports such species. No species that are federally listed or proposed for listing as threatened or endangered were known to occur in the project area when the project was authorized in 1986. After the completion of environmental clearances for the Authorized Project, however, steelhead in the Guadalupe River and the California red-legged frog were listed under the ESA.

The Corps has been informally consulting on an ongoing basis with NMFS regarding steelhead. In February 2000, the Corps prepared a Biological Assessment (BA) that addressed the expected effects on the Central California Coast evolutionarily significant unit (ESU) of steelhead and its critical habitat from the construction of flood protection components, project mitigation, and the project operation. The BA was used by the Corps to determine the need for formal consultation under Section 7 of the ESA. The Corps assumed, based on existing information, that formal consultation was required for the project. Subsequently, NMFS issued a Biological Opinion (BO) for the Proposed Action in August 2000 (Appendix 2). NMFS concluded that the Guadalupe River Project is not likely to jeopardize the continued existence of the federally threatened Central California Coast ESU of steelhead or result in the destruction or adverse modification of its critical habitat.

TABLE 1.5-1. Summary of Environmental Compliance for the Proposed Action

This table summarizes the status of consultation and other requirements that must be met by the Corps and SCVWD before the Guadalupe River Project can be completed.

Requirements	Status of Compliance/Expected Completion
National Environmental Policy Act	Ongoing as part of this document.
California Environmental Quality Act	Ongoing as part of this document.
Federal and California Endangered Species Acts	In compliance. Prepared Biological Assessments on listed species in the project area. Received Biological Opinions from NMFS and USFWS.
Magnuson-Stevens Fishery Conservation and Management Act	Preparation of Biological Assessment has met requirements for assessing essential fish habitat for chinook salmon. Received essential fish habitat (EFH) conservation recommendations from NMFS.
Fish and Wildlife Coordination Act	Ongoing. USFWS has participated in advisory groups reviewing or conducting endangered species surveys, conducted a Habitat Evaluation Procedures analysis for the project, and helped develop the MMP for the project. USFWS will continue to participate in MMP monitoring and adaptive management.
Clean Water Act	SWRCB will review water quality certification after the final design and environmental documents are completed.
Clean Air Act	In compliance. Conformity analysis is not required.
National Historic Preservation Act	Ongoing. Once Section 106 review process is completed, the project will proceed in accordance with conditions stipulated in the agreement with the State Historic Preservation Officer and appropriate agencies.
Executive Order 11988 – Floodplain Management	In compliance. Implementation of proposed modifications, including mitigation measures, will allow the Corps to accomplish the floodplain enhancement objectives of Executive Order 11988.
Executive Order 11990 – Protection of Wetlands	In compliance. Proposed modifications to the project will substantially reduce wetland and riparian impacts identified in the 1985 EIS and will include a more substantial and detailed riparian habitat restoration program.
Executive Order 12898 – Environmental Justice	In compliance. No minority or low-income areas or communities involved.
Migratory Bird Treaty Act	The Corps and SCVWD will comply with provisions of the Migratory Bird Treaty Act.
California Fish and Game Code (Section 1600 Lake or Streambed Alteration Agreement Program)	Ongoing. The project complies with Section 1600 by using this Report to address expected project effects.
Caltrans Encroachment Permit	Partially complete. A Cooperative Agreement between SCVWD and Caltrans was executed in October 1998. An encroachment permit will be required before construction begins.
Disabilities Regulations – Americans with Disabilities Act, Rehabilitation Act, and Architectural Barriers Act	Completed. Project adheres to the construction guidelines of the Uniform Federal Accessibility Standards and complies with regulations proposed for incorporation into the Americans With Disabilities Act Accessibility Guidelines.

The Corps has also been informally consulting with USFWS regarding the threatened California red-legged frog and snowy plover, as well as the endangered salt marsh harvest mouse and California clapper rail. In March 2000, the Corps prepared a BA that addresses the expected effects on these species from construction of flood protection components, mitigation, and the project operation. USFWS issued a BO regarding these species in August

2000 (Appendix 2). USFWS determined that the Guadalupe River Project is not likely to adversely affect the California red-legged frog, salt marsh harvest mouse, or California clapper rail, and is not likely to jeopardize the continued existence of snowy plover.

1.5.1.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires all Federal agencies to consult with NMFS regarding all actions or Proposed Actions permitted, funded, or undertaken that may adversely affect "essential fish habitat" (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. The phrase "adversely affect" refers to the creation of any impact that reduces the quality or quantity of EFH. Federal activities that occur outside an EFH but that may, nonetheless, have an impact on EFH waters and substrate must also be considered in the consultation process. Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered.

The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other Federal statutes, such as NEPA, the Fish and Wildlife Coordination Act (FWCA), the CWA, and the ESA. EFH consultation requirements can be satisfied through concurrent environmental compliance requirements if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and if the notification meets requirements for EFH assessments. The ESA compliance discussed in Section 1.5.1, "Federal Requirements," also addressed the expected project effects on chinook salmon EFH. Subsequently, NMFS provided EFH conservation recommendations. With implementation of the EFH conservation recommendations, USFWS concluded that significant improvements to the potential EFH of chinook salmon in the Guadalupe River are expected, and adverse impacts on chinook salmon potential EFH are mitigated.

1.5.1.4 Fish and Wildlife Coordination Act

The FWCA (16 USC 661 et seq.) requires Federal agencies to consult with USFWS, or, in some instances, with NMFS, and with State fish and wildlife resource agencies before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that wildlife concerns receive equal consideration to water resource development projects and are coordinated with the features of these projects. The consultation is intended to promote the conservation of fish and wildlife resources by preventing their loss or damage and to provide for the development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and State fish and wildlife resource agencies in project reports, such as documents prepared to comply with NEPA and CEQA, and to include measures to reduce impacts on wildlife in project plans.

USFWS prepared an FWCA report on the Guadalupe River Project in 1984. Between 1989 and 1994, USFWS provided the Corps with planning aid letters and with lists of endangered and threatened species and updates to these lists. USFWS has also participated in advisory groups, has been responsible for conducting a Habitat Evaluation Procedures (HEP)

analysis for the project, and has helped to develop an MMP for the project. USFWS has indicated to the Corps that this ongoing participation is satisfying the requirement of the FWCA. A letter prepared by USFWS that summarizes coordination efforts is included in Appendix 2.

1.5.1.5 Clean Water Act

Section 404. Section 404 of the CWA requires that a Federal project comply with regulations regarding the discharge of dredged or fill material into "waters of the United States," including wetlands. Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable waters of the United States. Section 404 jurisdiction typically encompasses the actions and areas regulated by Section 10; therefore, when applicable, the Corps combines the requirements of Section 10 with those of Section 404.

Actions typically subject to Section 404 requirements are those that would take place in wetlands or channels conveying natural runoff, including intermittent streams, even if they have been realigned. Artificial channels that convey only irrigation water usually are not included. Section 404 regulates any discharge activity below the ordinary high-water level– the water level with a flow equal to the mean annual flood– of a stream channel. Examples of such discharge activities include placement of fill material, placement or alteration of structures that have the intended effect of functioning as fill, or any discharge activity that would affect wetlands or the surface-water conveyance or capacity of a channel.

Requirements of Section 404 for the Guadalupe River Project will be fulfilled with the Section 404 (b)(1) Evaluation included in this Report (Appendix 1D), by issuing public notice on availability of the Report and opportunity for public hearing, and by obtaining certification under CWA as explained below.

Section 401. Under Section 401 of the CWA, applicants for a Federal license or permit to conduct activities that may result in a discharge of a pollutant into waters of the United States must obtain a certification from the State in which the discharge would originate or, if appropriate, from the interstate water pollution control agency that has jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all actions with Federal agency involvement that could affect State water quality, including actions requiring Federal agency approvals, must comply with Section 401.

The Guadalupe River Project is subject to the conditions of a certification under Section 401 issued by SWRCB in 1992, including the 1993 revisions and clarifications to the conditions of certification (Appendix 1F). SWRCB expressed two primary concerns resulting from changes to the Guadalupe River Project subsequent to authorization in 1986: (1) the need to summarize impacts on riparian resources and specify protective measures and (2) the need to incorporate fishery mitigation measures for these resources into a final MMP. The fishery mitigation measures are also required to fully mitigate any project-related thermal impacts on the armored and unarmored sections of the channel, including detailed vegetation planting and plant maintenance plans to reestablish vegetation cover. In addition, SWRCB specified elements that must be contained in the Final MMP and indicated that the MMP must be approved by the San Francisco Bay RWQCB, CDFG, USFWS, and NMFS (Appendix 1F).

In June 1992, the MMP was submitted to CDFG and USFWS; these agencies provided the comments contained in Appendix 3F. USFWS commented that the final MMP should include (1) a listing of proposed riparian mitigation areas and plans for planting these areas, including a species list, and (2) an additional description of the quantities and locations of vegetation provided as mitigation for loss of overhead cover vegetation.

On July 9, 1992, the Corps provided responses to both sets of comments, indicating commitments to modify the MMP in accordance with resource agency comments. A revised plan was submitted to USFWS for review in May 1993. On May 8, 1993, USFWS requested that another revision of the MMP be provided by the end of 1993 that would encompass specific mitigation actions for impacts on SRA cover vegetation, anticipating that construction plans would be completed by then. On May 27, 1993, the Corps requested that SWRCB review its proposed revisions to the MMP. On August 17, 1993, SWRCB issued a revised conditional certification in which it stated that certification would be deferred until all changes to the MMP were completed and approved by the appropriate resource agencies. On October 8, 1993, SWRCB reconsidered its determination (clarification of revised conditional certification), finding that the Corps' commitments must be implemented as a condition of certification and that further approval of the MMP by the resource agencies would therefore not be required. In a letter dated September 10, 1997, SWRCB acknowledged the continuing need for "comprehensively outlining expected elements of the final mitigation plan . . ."Finally, in a letter dated September 10, 1998, SWRCB indicated that it would reconsider certification after the final design and environmental documents were prepared.

The conditions of certification under Section 401 are reiterated below, along with the location of each element in the MMP (Appendix 3).

- **Summary of Impacts on Wetland, Riparian, and Fish Habitat.** A summary of impacts on wetland, riparian, and fish habitat expected to result from implementation of the Guadalupe River Project is presented in MMP Chapters 2 and 4 and MMP Appendices C and D. The summary includes narrative and maps that synthesize and update the information presented in previous environmental documents. For each reach of the river in which construction would take place, existing wetland, riparian, and fish habitats are described and the amount of habitat that might be affected by construction is indicated.

- **Compensatory Riparian Mitigation Plan.** Detailed descriptions of and plans for compensatory mitigation sites are provided in MMP Chapters 2 and 4 and MMP Appendices C and D. The plans include approximate locations, quantities, and species of mitigation plantings. Criteria used to evaluate whether mitigation has been successful in offsetting the loss of riparian functions and values are discussed under the measurable objectives summarized in Table 4-1 of the MMP. Chapter 4 of the MMP also includes a discussion of the monitoring procedures summarized in Table 4-2; provisions for reporting to concerned agencies are described in Section 4.9, "Reporting." Sample remedial actions will be implemented should monitoring indicate that the mitigation has not been fully successful, based on the measurable objectives. Chapter 2 of the MMP also describes the source and availability of irrigation water for mitigation plantings and provides information on how mitigation sites will be protected from urban effects.

- **Vegetation Protection Plan.** The vegetation protection plan will be part of the best management practices (BMPs) required in the project construction plans and

specifications. The selected construction contractor(s) will be responsible for implementing these plans under Corps oversight. General information for the vegetation protection plan is included as Appendix F of the MMP. SRA cover vegetation is shown in Appendix 1G, including both vegetation that would be adversely affected and vegetation that would be avoided by project construction

- **Fishery Mitigation Plan.** The design of the Guadalupe River Project includes a low-flow channel design for armored channel bed sections. The low-flow channel provides for fish passage and fish resting areas. The Guadalupe River Project also provides for operational standards for the secondary channel in Segment 2 and compensation for the effects of removing the U.S. Geological Survey (USGS) gaging weir upstream from the St. John Street Bridge. Table 4-1 of the MMP includes measurable objectives designed to ensure the maintenance in perpetuity of fish passage, fish-rearing habitat, and spawning gravels. Chapter 4 of the MMP also includes measures for the mitigation of adverse water temperature effects related to the project.

Section 402. Section 402 of the CWA prohibits the discharge of all pollution into surface waters unless permitted under the NPDES, which is administered by the EPA, or by a State agency with a federally approved control program. In California, Section 402 authority has been delegated to the SWRCB and is administered by RWQCBs.

Erosion and sediment delivery to the Guadalupe River will be minimized during project construction. Related efforts will include measures to minimize the potential for sediment to enter the river and interim measures to stabilize soil pending establishment of vegetative cover. As part of the SWPPP required for project construction, an erosion and sediment control plan will be prepared and incorporated into project construction plans and specifications. More specifically, for storm water discharges from construction sites, State Water Resources Control Board Order 99-08-DWQ authorizes NPDES General Permit No. CAS000002, Waste Discharge Requirements for Discharge of Storm Water Runoff Associated with Construction Activity. The San Francisco Bay RWQCB implements the provisions of General Permit CAS000002, and may issue an individual NPDES permit and waste discharge requirements for construction activities or projects found ineligible for coverage under the General Permit. The selected contractor(s) will be responsible for implementing the erosion and sediment control plan under Corps supervision, as required by the permitting process of the NPDES.

In addition, groundwater may be intercepted during excavation for the bypass-system's culverts. This groundwater would be pumped from the excavation area in order to dewater the construction site. This groundwater discharge will meet NPDES requirements for pH, dissolved oxygen, and temperature and will be treated, if necessary, to meet mass daily limits for metals and other constituents, and then discharged into the Guadalupe River. For groundwater extraction/construction dewater discharge, the San Francisco RWQCB may permit the discharge through Order No. 99-051 authorizing NPDES General Permit No. CAG912003, General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds, and Rescission of Order No. 94-087. The RWQCB may issue an individual NPDES permit and waste discharge requirements for groundwater extraction activities or dewatering projects found ineligible for coverage under the General Permit. The selected construction contractor(s) would implement the dewatering program under SCVWD supervision and in accordance with NPDES requirements.

If a General Permit application for either storm water or groundwater extraction is found ineligible for permitting under the limitations and requirements of a General Permit, the RWQCB may consider authorizing a single individual permit incorporating provisions applicable to both storm water and groundwater extraction activities.

Section 313. Section 313 of the CWA (US Code Title 33, Section 1323. Federal facilities pollution control) requires "...each department, agency, or instrumentality of the executive, legislative, and judicial branches of the Federal government having jurisdiction over any property or facility, or engaged in any activity resulting, or which may result, in the discharge or runoff of pollutants...shall be subject to, and comply with, all Federal, State, interstate and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution in the same manner, and to the same extent as any nongovernmental entity.

The Corps has complied with Section 313 of the CWA by complying with Sections 404, 401, and 402 of the CWA, California Fish and Game Code Section 1600, regional and local requirements of the San Francisco Bay Regional Water Quality Control Board and State Water Resources Control Board through the Water Quality Control Plan for the San Francisco Bay Basin and NPDES permitting. The Corps has considered and mitigated for changes in water temperature through onsite and offsite mitigation; considered and addressed suspended solids and biostimulatory nutrients through the SWPP, erosion and sediment control plan, and spill prevention and response plan; and considered and addressed toxic constituent through the spill prevention and response plan and the Water Quality Control Plan.

1.5.1.6 Clean Air Act

National ambient air quality standards (NAAQS) were established in 1970 by the Federal Clean Air Act (CAA) for six pollutants: carbon monoxide, ozone, particulate matter, nitrogen dioxide, sulfur dioxide, and lead. Areas that do not meet the ambient air quality standards are called nonattainment areas. The CAA requires states to submit a State implementation plan (SIP) for nonattainment areas. The SIP, which is reviewed and approved by the U.S. Environmental Protection Agency (EPA), must delineate how the Federal standards will be met. States that fail to submit a plan or to secure approval may be denied Federal funding and/or required to increase emission offsets for industrial expansion. The 1990 Amendments to the CAA established categories of air pollution severity for nonattainment areas, ranging from "marginal" to "extreme." SIP requirements vary, depending on the degree of severity.

The conformity provisions of the CAA are designed to ensure that Federal agencies contribute to efforts to achieve the NAAQS. EPA has issued two regulations implementing these provisions. The general conformity regulation addresses actions of Federal agencies other than the Federal Highway Administration and the Federal Transit Administration. General conformity applies to a wide range of actions or approvals by Federal agencies. Projects are subject to general conformity if they exceed emissions thresholds set in the rule and are not specifically exempted by the regulation. Such projects are required to fully offset or mitigate the emissions caused by the action, including both direct emissions and indirect emissions over which the Federal agency has some control.

The Corps has determined that a conformity analysis is not required for the Guadalupe River Project because emissions of reactive organic gases (ROG) and nitrogen oxides (NO_x) would be below the conformity thresholds of 50 tons of ROG and 100 tons of NO_x per year. A discussion of impacts on air quality associated with the Guadalupe River Project is included in Chapter 5, "Environmental Consequences."

1.5.1.7 National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, as amended, requires Federal agencies to take into account the effects of a proposed undertaking on cultural resources listed or eligible for listing on the National Register of Historic Places (NRHP). Because historic properties could be affected by the Guadalupe River Project, the Corps is complying with Section 106 of the NHPA. Section 106 requires Federal agencies or agencies for which they provide funding or issue permits to take into account the effects of their actions on properties that may be eligible for listing or that are listed in the NRHP.

The Section 106 review process consists of four steps: (1) identification and evaluation of historic properties, (2) assessments of the effects of the undertaking on properties that are eligible for listing in the NRHP, (3) consultation with the California State Historic Preservation Officer and appropriate agencies to develop an agreement addressing the treatment of historic properties, and (4) receipt from the Advisory Council on Historic Preservation of comments on the agreement or results of consultation. Once these steps are completed, the Guadalupe River Project would proceed in accordance with the conditions of the agreement.

1.5.1.8 Executive Order 11988 – Floodplain Management

Executive Order 11988 requires Federal agencies to recognize the significant values of floodplains and to consider the public benefits that would be realized from restoring and preserving floodplains. Under this order, the Corps is required to provide leadership and take action to accomplish the following objectives:

- Avoid development in the base floodplain, unless such development is the only practicable alternative
- Reduce the hazard and risk associated with floods
- Minimize the impact of floods on human safety, health, and welfare
- Restore and preserve the natural and beneficial values of the base floodplain

Subsequent to authorization in 1986, the Corps determined that the Authorized Project was in compliance with the Executive order. Although the project would not "restore and preserve the natural and beneficial values of the base floodplain," it was considered infeasible to reduce the risk and hazard of flooding while also enhancing floodplain values. Implementation of proposed modifications to the Authorized Project, including mitigation measures at the Guadalupe Creek and Reach A mitigation sites, would allow the Corps to simultaneously reduce flood risk and better accomplish the floodplain enhancement objectives of the Executive order. Therefore, the project is considered to be in compliance with the Executive order.

1.5.1.9 Executive Order 11990 – Protection of Wetlands

Executive Order 11990 directs Federal agencies, in carrying out their responsibilities, to provide leadership to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. This policy states that Federal agencies should avoid, to the extent possible, the short- and long-term adverse impacts associated with destruction or modification of wetlands. It also states that agencies should avoid undertaking and providing support for new construction in wetlands, including draining, dredging, channelizing, filling, diking, impounding, and other related activities, unless the agency finds that no practicable alternatives exist and all practical measures have been taken to minimize harm to wetlands.

Subsequent to project authorization in 1986, the Corps found that although the proposed channel modifications would result in impacts on wetland resources, no practicable alternative was available that would avoid the removal of riparian and wetland vegetation. The Corps adopted mitigation measures to minimize adverse impacts and to replace lost habitat values. Based on this information, the Corps determined that the Guadalupe River Project was, at that time, consistent with Executive Order 11990.

The proposed modifications to the Authorized Project would substantially reduce the effects on riparian vegetation and would include a more substantial and detailed riparian habitat restoration program. No wetlands were identified in Segments 3A and 3B and potential effects on wetlands in the Reach A mitigation site would be beneficial. Therefore, the Corps has determined that the Guadalupe River Project is consistent with Executive Order 11990.

1.5.1.10 Executive Order 12898 – Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," requires each Federal agency to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

In-channel flood-control improvements associated with the Guadalupe River Project would not be located in minority or low-income areas or communities. Similarly, construction of the bypass would involve disturbance only to lands that are currently vacant or are being developed as an office park. Because the Guadalupe River Project would not affect areas that are populated, developed, or proposed for residential development, the modifications would not disproportionately affect minority or low-income populations or communities.

1.5.1.11 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.) implements various treaties and conventions between the U.S., Canada, Japan, Mexico, and Russia, providing protection for migratory birds as defined in 16 USC 715j. The MBTA makes it unlawful for any person to take, kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. The MBTA does not protect the habitat of migratory birds. Construction of all project alternatives would comply with provisions of the MBTA.

1.5.2 State Requirements

1.5.2.1 California Environmental Quality Act

CEQA (Public Resource Code 21000 et seq.) is regarded as the foundation of environmental law and policy in California. The following are CEQA's primary objectives:

- Disclose to decision makers and the public the significant environmental effects of proposed activities
- Identify ways to avoid or reduce environmental damage
- Prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures
- Disclose to the public reasons for agency approval of projects with significant environmental effects
- Foster interagency coordination in the review of projects
- Enhance public participation in the planning process

CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, including State, regional, county, and local agencies, unless an exemption applies. It requires that public agencies comply with both procedural and substantive requirements. Procedural requirements include the preparation of the appropriate environmental documents, mitigation measures, alternatives, mitigation monitoring, findings, statements of overriding considerations, public notices, scoping, responses to comments, legal enforcement procedures, citizen access to the courts, notice of preparation, agency consultation, and State Clearinghouse review.

CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. When avoiding or minimizing environmental damage is not feasible, CEQA requires agencies to prepare a written statement of overriding considerations when they decide to approve a project that will cause one or more significant effects on the environment. CEQA establishes a series of action-forcing procedures to ensure that agencies accomplish the purposes of the law. In addition, under the direction of CEQA, the California Resources Agency has adopted regulations, known as the State CEQA Guidelines, which provide detailed procedures that agencies must follow to implement the law. SCVWD will use this EIR to comply with the State CEQA Guidelines and to document CEQA compliance.

1.5.2.2 California Fish and Game Code (Section 1600 Lake or Streambed Alteration Agreement Program)

CDFG regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to California Fish and Game Code Sections 1600-1607. Under Section 1601 of the California Fish and Game Code, any State or local governmental agency or public utility must notify CDFG if it proposes to (1) divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, (2) use materials from the streambeds designated by CDFG, or (3) dispose or

deposit debris, waste, or other materials containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by CDFG.

Any person, governmental agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel, or bank of any river, stream, or lake or proposing to use any material from a streambed must first notify CDFG of such proposed activity. This notification requirement applies to any work undertaken within the 100-year floodplain of a body of water or its tributaries, including intermittent streams and desert washes. In practice, however, the notification requirement generally applies to any work in the riparian corridor of a wash, stream, or lake that contains or once contained fish and wildlife or supports or once supported riparian vegetation.

1.5.2.3 Caltrans Encroachment Permit

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining State-owned roadways. Caltrans issues permits for projects affecting the rights-of-way (ROWs) of State-owned roadways. Caltrans issues permits for encroaching on land within its jurisdiction to ensure that the proposed encroachment is compatible with the primary uses of the State highway system, to ensure the safety of both the permittee and the highway user, and to protect the State's investment in the highway facility.

Actions proposed within, under, or over a State highway ROW– such as rerouting and protecting infrastructure; opening or excavating a State highway for any purpose; constructing and maintaining road approaches or connections to an ROW; grading within the ROW on any State highway; or placing, changing, or renewing an encroachment– require an Encroachment Permit. An encroachment requiring permanent access or maintenance within a freeway or expressway ROW can be considered for a permit only if the following restrictions are met:

- The encroachment is related to a public facility or to a utility dedicated to public use.
- Alternative locations for the encroachment are inordinately difficult or unreasonably costly.
- The encroachment is as near as possible to the outer boundary of the ROW.
- The encroachment is approved by the Chief of the Caltrans Office of Project Planning and Design and possibly also by the Federal Highway Administration when Federal facilities or funds are affected.

SCVWD is responsible for purchasing lands, overseeing easements, and providing ROWs for the Guadalupe River Project. In addition, SCVWD was responsible for securing a Cooperative Agreement with Caltrans for activities within the Caltrans ROW; the Cooperative Agreement was executed in October 1998 (Appendix 1H).

1.5.2.4 Disabilities Regulations

The Americans with Disabilities Act (ADA), the Rehabilitation Act, and the Architectural Barriers Act (ABA) Title II, and Section 202 of the ADA require projects administered by State and local governments to provide program accessibility to persons with disabilities as long as providing accessibility would not fundamentally change the purpose of the project. Section 504 of the Rehabilitation Act requires program accessibility for persons with

disabilities to any program or activity receiving Federal financial assistance. The ABA requires accessibility for persons with disabilities to federally financed facilities constructed or altered on behalf of the United States. To conform with the ADA, the Rehabilitation Act, and the ABA, the Corps and SCVWD have ensured that the recreational trail system incorporated into the Guadalupe River Project adheres to the construction guidelines of the Uniform Federal Accessibility Standards. In addition, the Corps and SCVWD have taken into consideration the regulations for trail development and outdoor recreational facilities that have been proposed for incorporation into the ADA Accessibility Guidelines.

1.5.3 Regional and Local Requirements

1.5.3.1 San Francisco Bay Regional Water Quality Control Board and State Water Resources Control Board

SWRCB and RWQCB for the San Francisco Bay Region establish policies and procedures that are designed to ensure the protection of surface water and groundwater from degradation. The RWQCB establishes beneficial uses of surface water and groundwater resources, along with narrative and numerical water-quality objectives to protect those uses, in its Water Quality Control Plan for the San Francisco Bay Basin (California Regional Water Quality Control Board, 1995). The RWQCB administers the NPDES permitting and Section 401 water quality certification processes.

Under the authority of Section 303(d) of the CWA, RWQCB and SWRCB list water bodies as impaired when not in compliance with designated water-quality objectives and standards. Section 303(d) also requires preparation of a Total Maximum Daily Load (TMDL) program for waters identified by the State as impaired. A TMDL is a quantitative assessment of a problem that affects water quality. The problem can include the presence of a pollutant, such as a heavy metal or a pesticide, or a change in a physical property of the water, such as dissolved oxygen or temperature. A TMDL establishes the amount of a pollutant present in a water body and specifies an allowable load of the pollutant from individual sources to ensure compliance with water quality standards. Once the allowable load and existing source loads have been determined, reductions in allowable loads are allocated to the individual sources.

1.5.3.2 City of San Jose Tree Ordinance

The City protects trees on private lands with a diameter at breast height (dbh) greater than 18 inches under the City's tree ordinance. Trees with a dbh greater than 18 inches are considered ordinance trees. Additionally, the San Jose City Council identifies heritage trees as those ordinance trees that have a special significance to the community because of their history, girth, height, species, unique quality, or other factors (San Jose Code Chapter 13.28). For trees on private land, the Corps and SCVWD will consult with the City Arborist to obtain a tree removal permit and meet City mitigation requirements for the loss of ordinance trees resulting from the Guadalupe River Project.

Based on a tree inventory performed in 1986 for the City's EIR for the Guadalupe River Park, a total of 399 ordinance trees are located within the Guadalupe River Park Project area (City of San Jose, 1989). The majority of these trees were located on or near the riverbanks. A total of nine heritage trees were identified in the Woz Way to Park Avenue Bypass Reach. It is uncertain how many of the trees outside the project area could be affected by construction of the Guadalupe River Project.

1.6 Other Pertinent Studies and Documents

1.6.1 Guadalupe River Interim Feasibility Report and Environmental Impact Statement (1985)

The 1985 Guadalupe River Interim Feasibility Report and Environmental Impact Statement (U.S. Army Corps of Engineers, 1985) evaluated the environmental effects of constructing the Authorized Project in the reach of the Guadalupe River from I-880 to Park Avenue. The plan presented in this 1985 EIS was for a single-purpose flood protection project that maximized flood protection benefits (Sections 1.2.1, "Authorizations," and 1.2.2, "Description of Authorized Project"). The findings of the 1985 EIS led to Federal authorization of the Guadalupe River Project in 1986. For construction purposes, the project was divided into the three reaches known as Segments 1, 2, and 3. The entire project encompassed the reach of the Guadalupe River between I-880 and I-280. Information from the 1985 EIS has been included in this Report, and that document is hereby incorporated by reference.

1.6.2 Guadalupe River Park Environmental Impact Report (1989)

In 1988, the City developed the Guadalupe River Park Master Plan and prepared an EIR for a regional urban river park along the Guadalupe River between I-280 and I-880 (City of San Jose, 1989). The 1988 Guadalupe River Park Master Plan included an almost continuous river walk on both the east and west banks between I-280 and I-880, access points at the intersection of roadways and the river walk, and a waterfall at the outlet of the Woz Way to Park Avenue Bypass Reach. Information from the 1989 Guadalupe River Park Master Plan EIR has been included in this Report, and that document is hereby incorporated by reference.

1.6.3 Guadalupe River Project Environmental Assessment (1990)

In 1990, the Corps prepared an EA to address design changes to the project evaluated in the 1985 EIS. These changes in the project design were made to meet flood protection objectives and to address changes in local conditions. The Corps did not prepare a Finding of No Significant Impacts (FONSI) for the EA because SCVWD endorsed proceeding with a locally preferred plan. The locally preferred plan included both flood protection objectives and development of the area as an urban park. The information included in the EA was carried forward to the Environmental Assessment/Initial Study (EA/IS) prepared by the Corps and SCVWD in 1991 (Section 1.6.5, "Guadalupe River Project Environmental Assessment/Initial Study (1991)").

1.6.4 General Design Memorandum (1991)

As the design of the flood protection project evaluated in the 1985 EIS proceeded, it became necessary to modify the project because the original design would no longer meet the local partner's need for flood protection. Generally, redevelopment was greater near the flood protection project area than had been considered during formulation of the project evaluated in the 1985 EIS. It was also determined that implementation of the project would substantially restrict public access to the river corridor because of the amount of fencing required to ensure public safety. In addition, mitigation sites originally proposed to compensate for the loss of riparian habitat became unavailable. These factors would have

resulted in the project not meeting the flood protection objectives indicated in the 1985 EIS or the recreational objectives of the Guadalupe River Park Master Plan (U.S. Army Corps of Engineers, 1993).

The 1991 GDM proposed a Recommended Plan that was consistent both with the flood protection objectives of the 1985 EIS and with the recreation concepts of the Guadalupe River Park Master Plan (U.S. Army Corps of Engineers, 1993). The Recommended Plan provided for conveyance of the 100-year design floodflow (17,000 cfs) and for installation of recreational elements of the local Guadalupe River Park Master Plan. The flood protection components of the Recommended Plan included an existing underground bypass conduit near the upstream limit of the project at Woz Way and provided for channel widening and other modifications. The Recommended Plan also included vertical concrete retaining walls with gabion and concrete terraces on the sideslopes. The Recommended Plan also maximized the retention of riparian vegetation and cultural resources and included a component for recreation.

1.6.5 Guadalupe River Project Environmental Assessment/Initial Study (1991)

In 1991, the Corps and SCVWD prepared an EA/IS and FONSI/Negative Declaration (U.S. Army Corps of Engineers, 1991a) to address modifications to the flood protection project evaluated in the 1985 EIS. The EA/IS assessed the additional effects on riparian corridor vegetation and fish and wildlife habitat that would result from the trail construction and recreational use associated with the Guadalupe River Park Project. Key modifications included replacing concrete floodwalls and riprapped sideslopes with planted gabion and stone terraces and incorporating components of the 1988 Guadalupe River Park Master Plan described above. Information from the 1991 EA/IS has been included in this Report, and the 1991 EA/IS is hereby incorporated by reference.

1.6.6 Guadalupe River Park Master Plan (1995)

In 1995, the City of San Jose Redevelopment Agency developed an updated Guadalupe River Park Master Plan that did not conflict with the Corps' Authorized Project (City of San Jose Redevelopment Agency, 1995). Under this plan, portions of the proposed park were expanded downstream from the confluence of the Guadalupe River and Los Gatos Creek, and trail and access point locations were refined. The City of San Jose Redevelopment Agency has already constructed portions of the Guadalupe River Park Master Plan. These include the Woz Way to Park Avenue river walk and the Confluence Point and West Project. The Woz Way to Park Avenue river walk consists of a system of trails along the tops of the banks of the Guadalupe River between Woz Way and Park Avenue. The Woz Way to Park Avenue river walk has been completed. The Confluence Point and West Project is at the confluence of Los Gatos Creek with Guadalupe River. This project includes a park, trails, riverbank gabions, and a pedestrian bridge over Los Gatos Creek (Talbot, pers. comm.). The Confluence Point and West Project has been completed except for the pedestrian bridge.

The Guadalupe River Project addressed in this Report includes components of the Guadalupe River Park Master Plan, as described in Chapter 3, "Alternatives, Including the Proposed Action." The City is currently revising the Guadalupe River Park Master Plan to conform to the proposed modifications to the Guadalupe River Project. Potential impacts of modifications to the trail system and recreational opportunities will be addressed in an environmental document when the Guadalupe River Park Master Plan is finalized.

1.6.7 Upper Guadalupe River Flood Protection Project

The Upper Guadalupe River Flood Protection Project (Upper Guadalupe River Project) is proposed by SCVWD to reduce the potential for flood damage along the upper Guadalupe River. To increase the capacity of the upper Guadalupe River, channel modifications are proposed along eight sections, or reaches, of the upper Guadalupe River, with a combined length of approximately 6.4 miles. The Upper Guadalupe River Project comprises two discrete segments: one from U.S. Highway 101 to I-880 (Reach A) and another from I-280 to above Blossom Hill Road (Reaches 6 to 12). Modifications are also proposed on adjacent portions of two tributaries, Canoas Creek and Ross Creek. Channel modifications include constructing bypass channels, widening the channel, adding benches, lining portions of the channel bank with gabions and cribwalls, and constructing floodwalls and levees. The expected flows from the Upper Guadalupe River Project were included in the assessment of the design floodflow for the Guadalupe River Project. Construction of the Upper Guadalupe River Project is expected to take place over the 25-year period from 2000 through 2025.

SCVWD and the Regulatory Branch of the Corps, San Francisco District, prepared a draft EIR/EIS for the Upper Guadalupe River Project in 1997. A final EIR/EIS will be issued in early 2000. The Upper Guadalupe River Project is addressed in more detail in Chapter 6, "Cumulative Impacts and Other Required Analyses."

1.6.8 Lower Guadalupe River Flood Protection Project

The proposed Lower Guadalupe River Flood Protection Project (Lower Guadalupe River Project) includes flood protection measures on the Guadalupe River between I-880 and the Alviso UPRR Bridge and downstream from Alviso in Alviso Slough. SCVWD and the Regulatory Branch of the Corps, San Francisco District, are preparing an EIR/EIS for the Lower Guadalupe River Project that will address a full range of alternatives for flood protection. These alternatives could include raising existing levees, setting levees farther back from the river, constructing flood bypasses, or dredging the channel, or a combination of some or all of these alternatives. The Lower Guadalupe River Project will have as a priority avoiding impacts on environmental resources within the Guadalupe River watershed and avoiding or minimizing impacts on listed species. The Lower Guadalupe River Project EIR/EIS and BA will address the direct effects of flood protection alternatives on natural resources, including listed species, in the lower Guadalupe River and Alviso Slough. It will also address the potential cumulative effects of the Lower Guadalupe River Project in combination with other projects in the Guadalupe River watershed.

The Lower Guadalupe River Project is expected to be constructed at the same time as the Guadalupe River Project and will provide capacity to handle the design floodflow associated with the Upper Guadalupe River Project and the Guadalupe River Project. With completion of the Lower Guadalupe River Project, expected flows at the Alviso UPRR Bridge with the design flood event are expected to be 17,000 to 20,000 cfs, depending on the amount of stormwater pumped from lands adjacent to the Guadalupe River. The Lower Guadalupe River Project is addressed in more detail in Chapter 6, "Cumulative Effects and Other Required Analyses."

1.6.9 Guadalupe Creek Restoration Project

The Guadalupe Creek Restoration Project site is bordered upstream by Masson Dam, downstream by the Almaden Expressway, to the north by residential development and the

Los Capitancillos percolation pond system, and to the south by Coleman Road. SCVWD proposes to establish 12,044 lf of SRA cover vegetation and improve aquatic habitat at this site to offset environmental effects associated with future SCVWD projects. Completion of an EIR/EIS addressing the potential effects of the Guadalupe Creek Restoration Project is expected in 2001. The Guadalupe Creek Restoration Project is scheduled for implementation in 2001.

The Guadalupe Creek Restoration Project is highly suitable for providing mitigation for a variety of activities along the Guadalupe River watershed. The Guadalupe River Project would use a portion of the Guadalupe Creek Restoration Project to mitigate effects on SRA cover vegetation and aquatic habitat. The Guadalupe Creek Restoration Project is independent of the Guadalupe River Project, and it will be implemented even if the Guadalupe River Project is not implemented.

1.6.10 State Route 87 Freeway Upgrade Project (1993)

The State Route 87 Freeway Upgrade Project will convert the existing four-lane Guadalupe Parkway (State Route 87) to a six-lane freeway. The project is designed to relieve severe congestion along Guadalupe Parkway and improve access to downtown San Jose, the Civic Center area, and San Jose International Airport. The target date for completion of the project is December 2003 (Gonzales, pers. comm.). Information from the EIS/EIR for the project has been included in this Report.

1.6.11 Guadalupe River Project Habitat Evaluation Procedures Analysis Report

A HEP analysis was conducted for the Guadalupe River Project with Bypass System Alternative. The HEP analysis was necessary to identify the loss of SRA cover vegetation quality caused by the Guadalupe River Project with Bypass System Alternative (Chapter 4.4 for a description of SRA cover vegetation). The resource agencies, including USFWS, obtained a commitment from the Corps to replace lost SRA cover vegetation quality by developing a postproject mitigation package for SRA cover vegetation quality that is equivalent to preproject SRA cover vegetation quality values. Such a mitigation package would "balance" the HEP analysis. The Guadalupe River Project HEP technical team convened to conduct the HEP analysis included representatives from the Corps, SCVWD, CDFG, USFWS, NMFS, and private interest and environmental groups represented by NHI.

To quantify effects on SRA cover vegetation quality that would result from the Guadalupe River Project with Bypass System Alternative, the Guadalupe River Project HEP technical team evaluated anticipated project effects on aquatic and terrestrial species that use SRA cover vegetation along the Guadalupe River and anticipated project effects on the habitat needs of these species. To represent the suite of species that use SRA cover vegetation along the Guadalupe River as well as their habitat needs, two evaluation species models and one cover type model were selected by USFWS and approved by the Guadalupe River Project HEP technical team. Rainbow trout and belted kingfisher were selected as the evaluation species, and nonsalmonid pool habitat was selected as the cover type. The results of the HEP analysis indicate that full compensation of anticipated project effects on steelhead, salmon, and belted kingfisher is achieved by a proposed mitigation package that includes onsite mitigation and offsite mitigation on Reach A and the Guadalupe River. However, full compensation of anticipated project effects on habitat values represented by the nonsalmonid pool habitat cover type is not achieved by this proposed mitigation package.

USFWS agreed to use excess mitigation for the rainbow trout evaluation species created by the proposed mitigation package to compensate for the deficit in the nonsalmonid pool habitat cover type. Relative value compensation is an approach used by USFWS that allows habitat values among habitats and species to be traded off at differing rates, depending on resource management goals (U.S. Army Corps of Engineers, 2000b). With this approach, the HEP analysis indicates that the proposed mitigation package for the Guadalupe River Project with Bypass System Alternative fully compensates for, or balances, the anticipated project effects on species represented by the rainbow trout and belted kingfisher evaluation species and on the nonsalmonid pool habitat cover type.

The results of the HEP analysis are reported in *A Habitat Evaluation Procedures Analysis: Guadalupe River Project, Downtown San Jose, California* (U.S. Army Corps of Engineers, 2000b).

1.6.12 Guadalupe River Project Thermal Report

Analyses of water temperature changes resulting from the construction and operation of the Guadalupe River Project were conducted to identify potential impacts on aquatic resources in the Guadalupe River watershed. Potential preproject and postproject effects on water temperature were simulated using the JSATEMP model; modeling incorporated potential changes in channel geometry and shade that would result from the Guadalupe River Project. The JSATEMP model simulates hourly water temperature for 39 segments of the Guadalupe River and three of its tributaries (Alamitos Creek, Arroyo Calero, and Guadalupe Creek). Postproject shade and channel geometry used in the temperature simulations reflect conditions immediately after project construction. The Guadalupe River Project Thermal Report (U.S. Army Corps of Engineers, 2000a) documents the assumptions used in the thermal analyses and describes the results of the analyses. The thermal analyses were incorporated into the HEP analysis (Section 1.6.10, "Guadalupe River Project HEP Analysis Report"). Information from the Thermal Report has been included in this Report, and the Thermal Report is hereby incorporated by reference.

1.6.13 Guadalupe River Project Mitigation and Monitoring Plan

In compliance with conditions of certification under Section 401 of the CWA, issued by SWRCB in 1992, including the 1993 revisions and clarifications to the conditions of certification (Appendix 1F), the Corps and SCVWD have prepared an MMP for the Guadalupe River Project (Section 1.5.4, "Clean Water Act.") The MMP is included as Appendix 3 of this Report. This MMP supersedes the 1992 MMP (U.S. Army Corps of Engineers, 1992), which was written to implement environmental commitments of the Authorized Project.

A team of representatives from the Corps, SCVWD, USFWS, NMFS, CDFG, and private interest and environmental groups, as represented by NHI, assisted in the preparation of the MMP. The MMP includes a discussion of the potential effects of the Guadalupe River Project, measures to mitigate those effects, related measurable objectives, and adaptive management measures. It also identifies specific responsibilities of the Corps and SCVWD for implementing the mitigation program and details the monitoring and reporting requirements for the mitigation program.

Primary mitigation and monitoring objectives for the MMP were developed in compliance with the conditional water quality certification requirements of regulatory agencies. Mitigation objectives reflect the specific resources to be addressed, identify specific amounts

of compensation, and identify the compensation ratios required to replace or substitute for unavoidable losses. Monitoring objectives describe methods of accounting for mitigation and set guidelines for the management, operation, and reporting of mitigation over the life of the Guadalupe River Project. Adaptive management has been included as an essential component of the MMP to facilitate achievement of mitigation objectives and to provide for implementation of remedial actions if the mitigation objectives are not achieved.

1.6.14 Guadalupe River Project Biological Assessments

1.6.14.1 NMFS Biological Data Report/Biological Assessment (January 2000)

In accordance with Section 7 of the ESA, a BA evaluating the potential effects of the Guadalupe River Project on fish species listed or proposed for listing as threatened or endangered was prepared by the Corps and submitted to NMFS (U.S. Army Corps of Engineers, 2000d). The species of concern are steelhead and chinook salmon. NMFS issued a BO in August 2000 which included Reasonable and Prudent Measures and Conservation Recommendations for these species. The Corps and SCVWD will review these measures and implement them or consult further with NMFS. Information from the BA submitted to NMFS has been included in this Report, and NMFS BA is hereby incorporated by reference.

1.6.14.2 USFWS Biological Data Report/Biological Assessment (February 2000)

In accordance with Section 7 of the ESA, a BA has been prepared by the Corps and submitted to USFWS for concurrence (U.S. Army Corps of Engineers, 2000c). USFWS BA describes the potential effects of the Guadalupe River Project on the California red-legged frog and the project's indirect effects on the western snowy plover, the California clapper rail, and the salt marsh harvest mouse and it concludes that the Guadalupe River Project is not likely to affect these species. Information from the BA submitted to USFWS has been included in this Report, and USFWS BA is hereby incorporated by reference. USFWS subsequently issued a BO in August 2000 that indicated that the Guadalupe River Project is not likely to adversely affect California red-legged frog, salt marsh harvest mouse, or California clapper rail. The BO also indicated that the Guadalupe River Project is not likely to jeopardize the continued existence of the snowy plover. The Corps and SCVWD are reviewing the Reasonable and Prudent Measures and Conservation Recommendations and may implement them or consult further with USFWS.

1.6.15 Santa Clara Valley Water District Stream Maintenance Report (August 2000). Programmatic EIR for the Santa Clara Valley Water District Stream Maintenance Program

SCVWD Stream Maintenance Program will provide long-term guidance to SCVWD to effectively implement on-going, routine stream maintenance projects in a cost-effective and environmentally sensitive manner. The Stream Maintenance Program report (Santa Clara Valley Water District, 2000), issued in August 2000, is a process and policy document that will be adopted by SCVWD and used in obtaining long-term permits for routine stream maintenance activities. The Stream Maintenance Program addresses all routine stream maintenance activities, such as sediment removal, vegetation management, woody debris removal, and bank protection, within SCVWD's jurisdiction. Approximately 829 miles of streams and 41 miles of canals are under SCVWD's jurisdiction in the Santa Clara Basin and the Pajaro River Basin, including the Guadalupe River and the Guadalupe River Project's project area. The Stream Maintenance Program report documents the results of extensive collaboration with Stream Maintenance Program external stakeholders. A Programmatic

EIR for the Stream Maintenance Program will be issued by SCVWD in 2001. SCVWD Stream Maintenance Program will not be implemented until after the Program EIR and a Endangered Species Act compliance has been completed and all necessary permits obtained. The Stream Maintenance Program report estimates that future routine channel maintenance, including woody debris removal, sediment removal and vegetation management activities, and bank stabilization could affect some of the riparian vegetation, nontidal wetlands, and tidal wetlands in SCVWD's jurisdiction. Proposed mitigation for potential adverse environmental effects associated with the Stream Maintenance Program has three components: (1) policies, implementation measures, and BMPs organized by type of activity and designed to avoid and minimize impacts; (2) compensatory mitigation through restoration and preservation; and (3) mitigation for potential impacts on sensitive species. A proposed compensatory mitigation package for significant residual impacts of the Stream Maintenance Program includes: (1) watershed and habitat protection through preservation of existing high-quality habitat, primarily in upper watershed areas; (2) restoration of riparian habitat through exotic pest plant removal and riparian re-vegetation, primarily in mid-watershed areas; (3) restoration and protection of tidal wetlands in the lower watershed, and (4) creation of nontidal wetlands. (Santa Clara Valley Water District, 2000).

The Stream Maintenance Report assumes that any new flood protection projects requiring changes in, or different types of, maintenance activities, as compared to the ongoing maintenance occurring before the project is constructed, will either be considered in the environmental documentation for the new project or in an environmental document developed in connection with the maintenance activities themselves.

SCVWD currently conducts routine channel maintenance on the Guadalupe River between I-280 and I-880, including the Guadalupe River Project area. The existing, on-going maintenance activities in the project Area were included in the August 2000 Stream Maintenance Report, and will be included in the 2001 Programmatic EIR for the Stream Maintenance Program. Therefore, the Programmatic EIR for the Stream Maintenance Program will evaluate the impacts of ongoing and future maintenance activities in the project area, and provide mitigation for future routine maintenance activities, as appropriate.

As discussed in Chapter 3 (Section 3.4.4, "Operation and Maintenance"), maintenance activities required for each Project alternative proposed in this Report encompass only the on-going, routine, maintenance activities presently being implemented by SCVWD in the project area. There are no maintenance activities associated with any of the three proposed Project alternatives that are significantly different than what has been employed in the past in the project area. Therefore, the maintenance activities required by the proposed modifications to the Guadalupe River Project are included and described in the August 2000 Stream Maintenance Report. The impacts of all maintenance activities described in Chapter 3 of this Report, and the appropriate mitigation for those impacts (if any), will be addressed in the Programmatic EIR for the Stream Maintenance Program. Consequently, the routine channel maintenance activities required in the project area after construction of the proposed modifications to the Guadalupe River Project will not be discussed in Chapter 5 (Environmental Consequences) of this Report.

1.7 Report Organization

This Report has been organized to present pertinent information regarding the planning process, the Bypass System Alternative, the Refined Bypass System Alternative, and potential project impacts. It is intended to meet NEPA and CEQA requirements for assessing potential adverse impacts on the environment as well as Corps project re-evaluation guidelines. Important NEPA and CEQA terms are presented in Table 1.7-1.

The document has been divided into eight primary analytical chapters, each dealing with a specific subject area. Chapters 1 through 7 and 9 through 11 provide information that meets the requirements of NEPA, CEQA, and the GRR planning processes. Chapter 8 is specific to Corps GRR requirements and supports decisions by the Corps and SCVWD for project approvals.

TABLE 1.7-1. Important NEPA and CEQA Terms
This table lists terms that are used under NEPA and CEQA.

NEPA	CEQA
Cooperating agency	Responsible agency
Proposed Action	Proposed project
No-action alternative	No-project alternative
Environmentally preferred alternative	Environmentally superior alternative
Purpose and need	Project objectives
Affected environment	Environmental setting
Environmental Impact Statement (EIS)	Environmental Impact Report (EIR)
Notice of Intent (NOI)	Notice of Preparation (NOP)
Notice of Availability (NOA)	Notice of Completion (NOC)
Record of Decision (ROD)	Findings

The sections of the Report are described briefly below.

Volume 1

Chapter 1 – Introduction

This chapter provides background information concerning the purpose and need for the Proposed Action, project authorizations, and project status, as well as scope and intent of the document. It highlights agency and public concerns expressed during the planning process and notes linkages with other project, permit, and consultation requirements.

Chapter 2 – Development and Evaluation of Alternatives

A discussion of the formulation, evaluation, and screening of alternative plans and scenarios that led to identification of the Proposed Action is provided in this chapter. It includes a discussion of past planning processes to put identification of the Proposed Action in context and provides descriptions of alternatives that were eliminated from further consideration.

Chapter 3 – Alternatives, Including the Proposed Action

This chapter provides descriptions of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative (Proposed Action). These descriptions serve as the basis for the analysis of potential adverse environmental effects in subsequent chapters.

Chapter 4 – Affected Environment

A detailed presentation of existing environmental conditions within the project area is made in this chapter. This includes discussions of hydrology, soils and river geomorphology, water quality, biological resources (including fish and wildlife), land uses, recreation, aesthetics, transportation, air quality, noise, and cultural resources.

Chapter 5 – Environmental Consequences

This chapter qualitatively and quantitatively describes potential impacts on the environment as a result of implementation of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative relative to existing conditions. Potential effects are analyzed for each of 10 major environmental resource categories.

Chapter 6 – Cumulative Impacts and Other Required Analyses

This chapter qualitatively describes potential impacts on the environment from the incremental implementation of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative when each is added to implementation of other closely related past, present, and future projects in the Guadalupe River assessment area. Descriptions of closely related projects are provided. Potential cumulative impacts are discussed again for each of the 10 major environmental resource categories.

Chapter 7 – Coordination and Consultation

Public and agency involvement in all aspects of the planning process is summarized in this chapter. The chapter summarizes how past public input has shaped identification of the Proposed Action and provides information to the reader on future opportunities to refine the Proposed Action.

Chapter 8 – Identification of the Recommended Plan

This chapter presents information specific to the Corps' project re-evaluation requirements for identification of a "Recommended Plan," which is the same as the Refined Bypass System Alternative. The chapter summarizes selection criteria and rationale used and potential constraints to implementation, as well as the environmental, economic, and social benefits and costs of the project. A Proposed Action graphic foldout is included in this chapter.

Chapter 9 – Document Recipients

A list of individuals and organizations that will receive a copy of the Draft Report, plus their addresses, is presented.

Chapter 10 – List of Preparers

A list of individuals and organizations that contributed to the preparation of the Report is provided.

Chapter 11 – References

This chapter lists references, including studies, reports, analyses, and other reference materials, used in preparation of this Report.

Glossary, Plus Foldout Acronyms and Abbreviations

An alphabetical listing of important terms, phrases, and acronyms with their definitions is presented to aid the reader in understanding the document. The list of acronyms is made available as foldouts to provide the reader with a convenient reference while reading the document.

Index

A listing of key words for the Report and where they can be found in the document.

Volume 2A

Appendix 1 – Environmental

Appendix 2 – Pertinent Correspondence

Appendix 4 – Comments and Responses

Volume 2B

Appendix 3 – Mitigation and Monitoring Plan

Volume 3

Appendix 5 – Engineering

Appendix 6 – Real Estate Plan

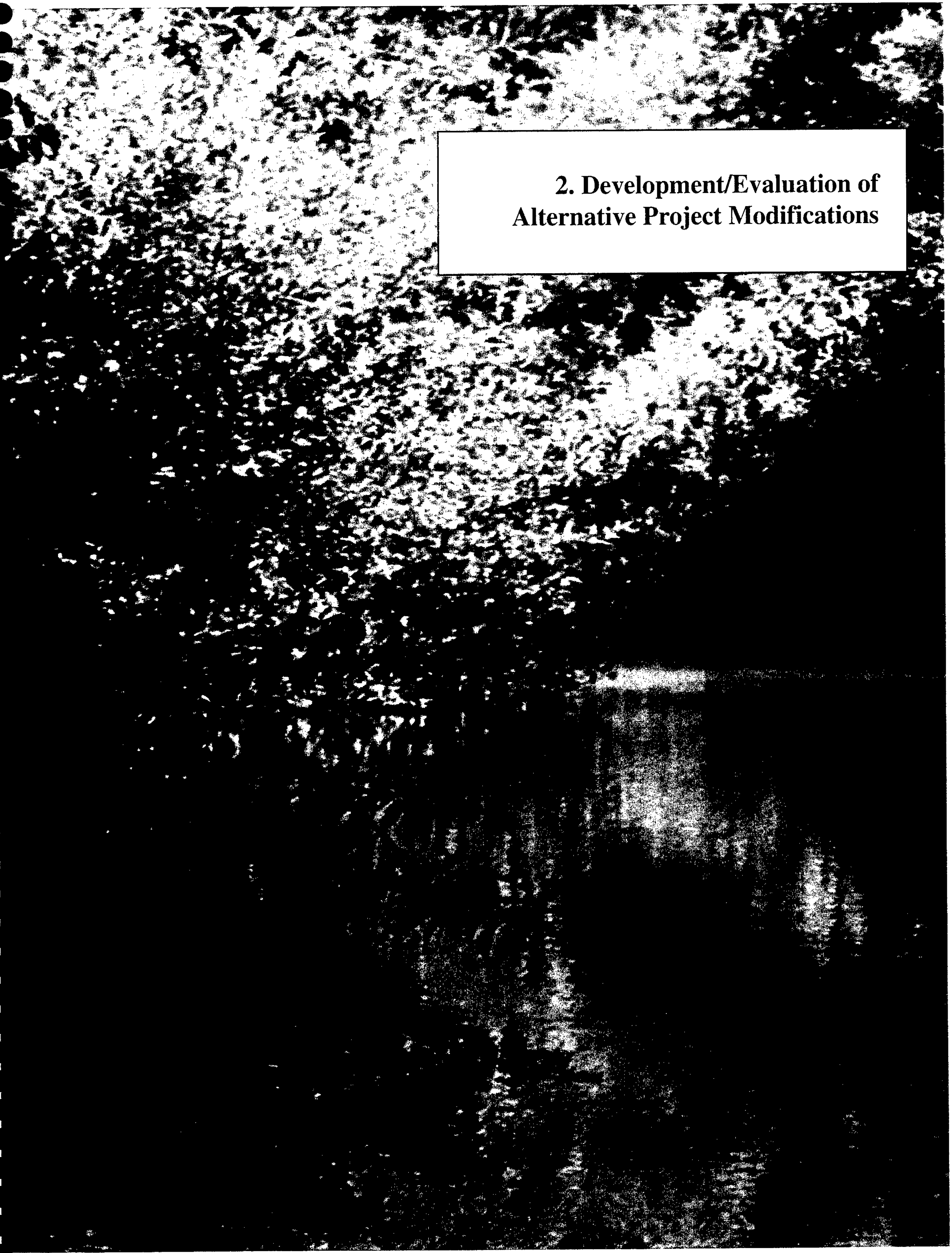
Appendix 7 – Economics Report

Appendix 8 – Recreation

Appendix 9 – Cost Effectiveness and Incremental Cost Analysis

Appendix 10 – Habitat Evaluation Procedures Analysis

2. Development/Evaluation of Alternative Project Modifications



KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions in Chapter 2:

The Refined Bypass System Alternative is now identified as the Proposed Action alternative. This change was made after the Refined Bypass System Alternative was found to be environmentally superior, environmentally preferable, and less costly during the lead agencies' review of the Draft.

Specific responses to comments on the Draft Report are presented in Appendix 4 (Volume 2) with highlights and strikeouts showing where portions of the Draft Report were modified as reflected in this Final Report.

CHAPTER 2

Development and Evaluation of Alternative Project Modifications

The process for the development and evaluation of alternatives to the Authorized Project was conducted in accord with standard federal procedures for planning water resources projects, regulations, and laws, and the requirements of NEPA and CEQA. An array of alternative project modifications was considered that would better meet the Authorized Project's objectives for flood protection, recreation, and environmental compliance while avoiding and mitigating adverse effects to the maximum extent practicable. These alternatives were developed and evaluated specifically to meet the objectives described in Section 1.2.4 and in consideration of the concerns of the resource agencies and other interested persons raised during the public scoping process. This chapter describes the plan formulation and evaluation criteria, screening of the alternatives, and criteria for the selection of the Recommended Plan/Proposed Action.

2.1 Plan Formulation and Evaluation Criteria

2.1.1 Overview

The 1985 Feasibility Report and accompanying environmental documentation evaluated a wide array of alternatives and their potential effects as the basis for approving the Authorized Project. Subsequent project-related technical studies, environmental analyses, and reports were completed. Pertinent documents are incorporated by reference and listed in Section 11.1.

After implementation of about one-third of the Authorized Project, it became clear through continuing resource agency cooperation and threatened law suites, that project modifications would be necessary to meet conditions for water quality certification, requirements to assess potential project effects on two newly listed threatened and endangered species, and continuing flood protection objectives (Section 1.2.3).

In June 1997, staff from the USFWS, CDFG, NMFS, and the SWRCB met with the Corps and SCVWD to express their concerns about the then-existing mitigation measures for the project. The following priorities were identified by the resource agencies.

- Redesign the project to avoid impacts and maximize onsite mitigation.
- Maximize onsite revegetation to replace shaded riverine aquatic (SRA) cover.
- Replace the quality as well as the quantity of affected SRA cover.
- Provide additional fisheries mitigation.

- Provide thermal mitigation (to avoid or compensate for water temperature increases that may affect the health of listed threatened or endangered fish species).

In December 1997, the Corps and SCVWD joined with the City and the SJRA to initiate a collaborative and facilitated program to resolve the mitigation disputes. Thus, the Guadalupe River Flood Control Project Collaborative (Collaborative) was established, comprised of representatives involved in the dispute resolution process: Corps, SCVWD, City, SJRA, USFWS, NMFS, CDFG, SWRCB, RWQCB, and the Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited (represented by NHI). The main objective of the Collaborative was to develop a Dispute Resolution Memorandum (DRM) for all of the involved entities to endorse.

The development of alternative project modification plans began with identification of the project objectives, stated in Section 1.2.4, and ideas, concepts, measures, and options to potentially achieve those objectives. Intensive specialized environmental and engineering studies were undertaken to develop and evaluate feasible alternatives as the basis for the recommendations in this Report. Environmental review studies included: an expanded HEP evaluation, temperature modeling, evaluation of previous designs, development of alternative plans, and hydraulic and sedimentation analyses.

In July 1998, the Corps and SCVWD agreed to redesign a portion of the Authorized Project to minimize impacts on SRA cover vegetation and to revise the project's mitigation and monitoring plan (MMP). Since then, the Corps and SCVWD, in coordination with environmental regulatory agencies and the Collaborative, have been refining objectives, investigating project modifications that satisfy the ESA and the CWA, and working to develop an acceptable MMP. In April 1999, these agencies and the Collaborative formally accepted a draft MMP as a basis for determining an alternative's feasibility in an amendment to the DRM.

Potential alternative modifications to the Authorized Project were refined and evaluated for their effectiveness in achieving the objectives described in Section 1.2.4 for preventing flood damage, preservation and mitigation for loss of, or damage to, fish and wildlife habitats, and the enhancement of recreation in and adjacent to the Guadalupe River in downtown San Jose consistent with the MMP. In addition, all the alternative modifications were analyzed, as part of the re-evaluation of the Authorized Project, for overall applicability and feasibility in the study area.

These alternatives were rigorously evaluated using the Corps (Corps of Engineers, 1996) and SCVWD planning process (Figure 2.1-1) and criteria. Only two alternatives, the Bypass System and Refined Bypass System Alternatives, fulfill the stated objectives and screening criteria comprised by that screening process. In addition to these two alternatives, both NEPA and CEQA require that the No Action Alternative be evaluated. This chapter summarizes the analysis process that is detailed in Alternative Development Documentation (Corps of Engineers, 2000e), on file in the Corps' Sacramento District Office.

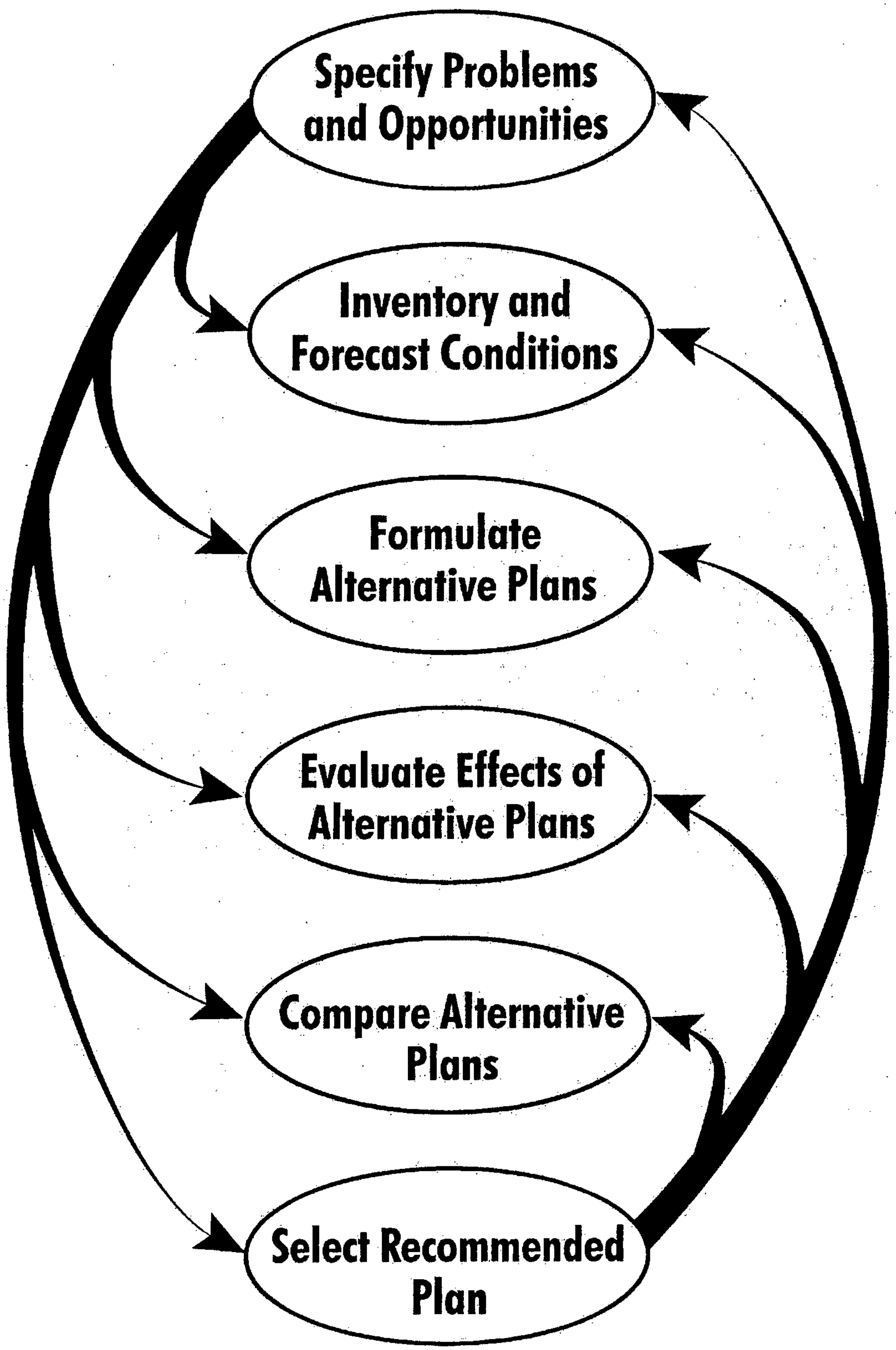


FIGURE 2.1-1
Corps Planning Process

2.1.2 Alternative Development and Evaluation Criteria

The Corps and SCVWD developed and evaluated alternative modifications to the Authorized Project based on criteria developed by the U.S. Water Resources Council (Corps of Engineers, 1996). The criteria of the U.S. Water Resources Council for alternative formulation and evaluation includes the directives found in NEPA, CWA, and CEQA and provide for the consideration of the positive and negative effects of the proposed alternatives. These include long-term environmental, economic, and other social impacts, including future conditions in the absence of any action, presented in a comparative format. The following concerns and criteria were considered in the formulation and evaluation of alternative project modification plans to refine the Authorized Project.

2.1.2.1 National Economic Development (NED) and Environmental Protection

It is a Federal objective that Federal water resources projects contribute to national economic benefit while protecting the Nation's environmental resources, consistent with pertinent Federal, State, and local laws, regulations, and policies. Economic analyses identify the potential beneficial and adverse effects that the alternatives may have on the national economy. Beneficial effects are increases in the economic value of the national output of goods and services attributable to an alternative. For the alternatives set forth in this report, benefits are expressed in terms of reduction of flood damages and losses, increased habitat and recreational opportunities, and community improvements in downtown San Jose.

2.1.2.2 Environmental Quality

Federal, State, and local environmental quality goals and policies are considered to evaluate the long-term effect that the alternatives may have on significant environmental resources. Significant environmental resources are defined by the Water Resources Council as those components of the ecological, cultural, and aesthetic environments which, if affected by the alternatives, could have a material bearing on the decision-making process.

2.1.2.3 Other Social Effects

Public Health and Safety. The alternatives must be designed in consideration of public health and safety. In addition, flood protection facilities and habitat improvements must be designed to prevent loss of life. For example, access structures must be included to allow egress from the open channels as water rises in the early flood stages. Bypass channels may be covered to prevent ingress before or during flood events. In addition, flood protection structures should be designed to reduce the potential risk to public health and safety due to transience along the channel, because of potential hazards.

Preservation of Cultural and Historic Values. The alternatives must be designed to protect cultural and historical resources. This protection will be accomplished primarily through increased flood protection of all structures, including cultural and historical resources near the river. The alternatives must also be aligned to avoid and/or compensate for potential destruction of cultural and historical resources.

2.1.2.4 Primary Plan Formulation and Evaluation Criteria

Completeness. Completeness is the extent to which a plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. It is a determination of whether the alternative includes all elements necessary to achieve planned local and national objectives.

Effectiveness. Effectiveness is the extent to which a plan alleviates the specified problems and achieves the specified opportunities. It can also be defined as a measure of the extent to which a plan achieves planning, design, and construction objectives.

Efficiency. Efficiency is the extent to which a plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.

Acceptability. Acceptability is the workability and viability of a plan relative to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies. It is also defined as acceptance of the plan by the project partner and the interested public. From the standpoint of flood protection, alternatives that provide less than 1 percent chance of recurrence (at least) in any given year are more acceptable than alternatives that provide a greater than 1 percent chance of recurrence. Finally, an acceptable project must be compatible with the downtown San Jose Redevelopment Program.

2.2 Preliminary Screening (Alternative Project Modifications Considered and Eliminated from Detailed Study)

2.2.1 Initial Alternative Comparison

After implementation of the remaining portions of the Authorized Project was stopped in 1996 (Section 1.2.3), the Corps and SCVWD committed to reevaluate previous alternatives and to develop and evaluate new alternative modifications to the Authorized Project to meet the water quality certification and ESA compliance objectives specified in Section 1.2.4. The array of alternatives evaluated by the Corps and SCVWD is shown below and is illustrated in Figure 2.2-1 (Corps of Engineers, 2000e).

- A revised channel-widening alternative
- An upstream detention alternative
- The authorized project with additional mitigation
- Six bypass alternatives
- Eight bypass variations

2.2.2 Revised Channel-Widening Alternative

This alternative, initially considered in the 1985 feasibility report and EIS for the Authorized Project (U.S. Army Corps of Engineers, 1985) would involve the widening of the Guadalupe River channel downstream from the State Route 87 viaduct at San Fernando Street. It would include the installation of box culverts to convey flood flows under the Santa Clara Street Bridge. The river would be widened on the eastern bank between Santa Clara Street and Los Gatos Creek.

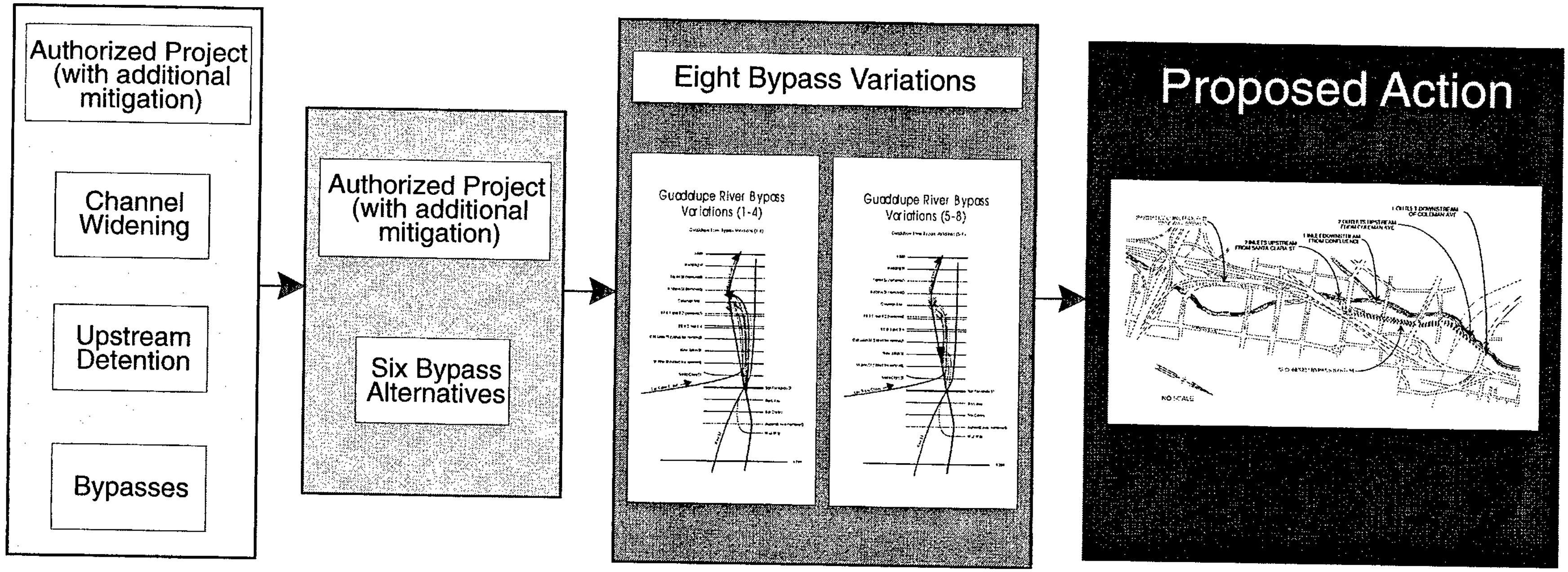


FIGURE 2.2-1
GRR Alternative Evaluation Process

This alternative was not evaluated further because of space limitations upstream from Santa Clara Street and the relatively short distance between Santa Clara Street and the Los Gatos Creek confluence. In addition, high flow velocities would require some armoring of the channel banks downstream from Santa Clara Street.

2.2.3 Upstream Detention Alternative

An upstream detention alternative would involve the construction of two new dams and improvements to and changes in the operation of Lenihan Dam. The new dams would be operated to reduce the extent of the flood protection improvements required under the Authorized Project. Various locations for upstream detention were considered. However, this alternative was dropped from further consideration because the components were all either economically infeasible or would not meet the objective of providing 100-year flood protection. The following dam locations and reservoir modifications were considered under this alternative.

2.2.3.1 New Guadalupe Dam

Construction of a new dam approximately 2 miles downstream from the existing Guadalupe Dam was considered. The new dam would be 65 feet high and have the capacity to capture the entire 100-year flood hydrograph at that location. This plan was removed from further study when analysis showed that the dam would not provide 100-year flood protection farther downstream along the Guadalupe River in downtown San Jose because of additional inflows between the dam and San Jose. The plan was also deemed infeasible from an economic viewpoint with a low Benefit/Cost (B/C) ratio of 0.33:1.

2.2.3.2 Raising Lenihan Dam

The raising of Lenihan Dam by about 25 feet to provide 15,000 acre-feet of flood storage capacity was considered. This would reduce 100-year flows in the Guadalupe River from 17,000 cfs to 11,000 cfs. However, since the capacity of the river channel through downtown San Jose is only 8,000 cfs, flooding would still occur. Because of the continued flooding and a low B/C ratio of 0.67:1, this plan was removed from further consideration.

2.2.3.3 Hooker Dam

Construction of a new dam upstream from Lenihan Dam was considered to provide additional flood protection storage and increased flood protection for the Guadalupe River. The dam would be located midway between the Lenihan and Austrian dams. This plan was eliminated from further study because the drainage area tributary to the proposed facility would be only 17 square miles and would not provide the flood protection needed.

2.2.3.4 Alter Operation of Lenihan Dam

Reoperation of Lenihan Dam on Lexington Reservoir for the dual purposes of flood protection and water supply was considered. This would require lowering the water level before the flood season and necessitate purchasing water from sources outside the watershed to make up for the estimated 7,000 acre-foot per year loss in water supply. The projected costs to purchase the lost water supply were about three times the average annual benefits, making this plan infeasible.

2.2.4 Authorized Project with Additional Mitigation

This alternative would not change any of the flood protection features of the Authorized Project, but would add additional environmental mitigation features. Five additional mitigation

elements were incorporated in this alternative: avoidance of impacts and maximization of onsite mitigation; maximization of onsite revegetation to replace lost SRA cover; maximization of offsite revegetation to replace lost SRA cover; and aquatic habitat mitigation, including thermal mitigation. The intent was to add additional mitigation to compensate for all adverse fish habitat and water temperature environmental effects of the Authorized Project.

Analysis determined that a minimum of 33,137 lf of SRA cover planting would be needed to at least partially compensate for the projected impacts of the Authorized Project on SRA cover (U.S. Army Corps of Engineers, 2000c). This alternative is not implementable, because there is not available area along the Guadalupe River and tributaries to install that amount of SRA cover and unidentified additional amounts of SRA cover. Thus, this alternative could not mitigate water temperature and anadromous fish impacts of the Authorized Project.

2.2.5 Preliminary Bypass Alternatives

In March 1998, the Corps and SCVWD, working with concerned resource agencies developed six bypass alternatives that would reroute floodflows around the downtown area. Bypass alternatives were identified for further consideration because they would provide the same level of flood protection as the Authorized Project but would avoid or minimize impacts to remaining SRA cover in the downtown reach. The six alternatives, which were evaluated based on technical, environmental, and economic factors, are summarized below. They were referred to as "Alternative 2-1" through "Alternative 2-6." by the project team and are listed as such below.

Feasibility level cost estimates were developed for each of the six bypass alternatives based on the savings from or additions to the costs already identified in the Authorized Project.

2.2.5.1 Six Bypass Alternatives

Alternative 2-1. A covered, double-box culvert bypass extending from Santa Clara Street to upstream from Coleman Avenue on the eastern bank of the Guadalupe River. Costs for Alternative 2-1, additional to the costs for the Authorized Project, were estimated at $17.8 million. This alternative had fewer adverse effects on existing habitat than Alternatives 2-2 and 2-3, but did not address hydraulic factors as effectively as Alternatives 2-5 and 2-6. In particular, the flows from Los Gatos Creek would not be adequately conveyed by this alternative without widening of the natural channel downstream from the confluence with the creek. Therefore, this alternative was eliminated from further evaluation.

Alternative 2-2. A covered, double-box culvert bypass from Santa Clara Street to New Julian Street on the eastern bank and a covered double-box culvert from New Julian Street to the UPRR tracks on the western bank. Additional costs for this alternative were estimated to be $18.3 million. This alternative would minimize risks from potential hazardous waste sites and reduce the required land acquisition, but would have greater adverse effects on existing SRA cover vegetation than Alternatives 2-1, 2-4 and 2-5. This alternative also has the potential for severe hydraulic problems at the inlet to the second bypass. Therefore, this alternative was eliminated from further evaluation.

Alternative 2-3. A covered, double-box culvert bypass from Santa Clara Street to New Julian Street on the eastern bank. Additional costs to construct this alternative were estimated to be $14.2 million. This alternative would minimize downstream land acquisition, but would have the greatest adverse effects on existing SRA cover vegetation and associated water temperatures, of all the alternatives. Therefore, this alternative was eliminated from further evaluation.

Alternative 2-4. An open, earthen channel bypass extending from upstream from Santa Clara Street to upstream from Coleman Avenue on the eastern bank of the Guadalupe River. This alternative would have fewer adverse effects on existing SRA cover vegetation than Alternatives 2-2 and 2-3, but without the addition of an inlet at the confluence with Los Gatos Creek would not address hydraulic factors as effectively as Alternative 2-5. This alternative would also have higher social impacts (safety), and would require additional rights-of-way. At $29.8 million of additional costs, it would have a significantly higher cost than other bypass alternatives.

Alternative 2-5. A covered, double-box culvert bypass extending from upstream from Santa Clara Street to upstream from Coleman Avenue on the eastern bank of the Guadalupe River. Additional cost for this alternative was estimated to be $18.5 million. The alternative would include a double entrance to the box culvert near the confluence with Los Gatos Creek to adequately convey flood flows at this location. This alternative would have the least adverse effects on existing SRA cover vegetation of the six alternatives.

Alternative 2-6. A covered, double-box culvert bypass from the confluence of Los Gatos Creek and the Guadalupe River near St. John Street to upstream from Coleman Avenue on the eastern bank of the Guadalupe River. The estimated cost for the additional work was $14.4 million. This alternative would have more adverse effects on existing SRA cover vegetation than Alternatives 2-1, 2-4, and 2-5. Therefore, this alternative was eliminated from further evaluation.

The results of the evaluation of the initial 6 bypass alternatives indicated that Alternatives 2-4 (with an additional inlet) and 2-5 were the only alternatives that met all planning, design, and environmental criteria. Because both remaining alternatives provide the same flood protection and recreation benefits, Alternative 2-5, the least costly of the two (Table 2.2-1), would provide the greatest net benefits and was identified as the NED plan.

TABLE 2.2-1. Cost of Remaining Alternatives ($1,000)

Alternative	Savings [1]	Additional Cost [2]	SRA Mitigation Cost	Total Cost
2-4	($25,200)	$55,200	$489	**30,489**
2-5	($25,200)	$43,200	$489	**$18,489**

[1] Savings from Authorized Project
[2] Additional cost over Authorized Project

Early in 1998, eight bypass variations of double- and triple-box culverts on the eastern bank of the river were developed based on Alternative 2-5. The development and ranking of the eight bypass variations are discussed in Section 2.2.5.2, below.

2.2.5.2 Bypass Alternatives Evaluated in the Habitat Evaluation Procedures Analysis

Concurrent with the March 1998 evaluation of the six bypass alternatives described under Section 2.2.5.1, the multiple agency advisory-group requested that a revised HEP analysis be conducted to quantify bypass effects on SRA cover vegetation (see Section 1.6.11). The HEP analysis was conducted prior to the final selection and design of a preferred bypass alternative at the request of the advisory group. Two of the six bypass alternatives were selected to be evaluated as part of the HEP analysis. Alternative 2-1 was selected for HEP analysis because it was thought to have the lowest adverse effects on SRA cover vegetation. Alternative 2-6 was selected for HEP analysis because it was thought to have the greatest adverse effects on SRA cover vegetation. By evaluating both Alternative 2-1 and 2-6, the full range of possible adverse effects on SRA cover vegetation from any bypass alternative was captured in the HEP analysis.

At the conclusion of the evaluation of the six-bypass alternatives, Alternatives 2-5 and 2-6 were brought forward for additional evaluation and Alternative 2-1 was dropped from consideration due to hydraulic factors. Alternative 2-5 was not specifically evaluated in the HEP analysis because adverse effects on SRA cover vegetation from this alternative would be the same as for Alternative 2-6.

In March 1999, Alternative 2-6 was revised as part of the in-progress HEP analysis to reflect refinements made to Alternatives 2-5 and 2-6 as part of the more detailed bypass alternative evaluation begun in January 1999. The revised Alternative 2-6 reflected a change from double to triple culverts, with an inlet at the confluence with Los Gatos Creek. This refined alternative is identified in the HEP analysis report (U.S. Army Corps of Engineers, 2000c) as the Triple Bypass System alternative (it was also identified as Alternative 8 [see Section 2.2.5.3 below] in the detailed bypass alternative evaluation). At this same time, Alternative 2-1 in the HEP analysis was renamed the Double Bypass System alternative to more easily identify the distinguishing features between the two alternatives evaluated in the HEP analysis. In addition to the Double and Triple Bypass System alternatives, the Authorized Project was also evaluated in the HEP analysis to provide a context for evaluating the proposed bypass alternatives.

The Triple Bypass System alternative evaluated in the HEP analysis closely resembles the Bypass System Alternative and the Refined Bypass Alternative (see Section 2.2.5.4 below) and appropriately captures all possible adverse effects on SRA cover vegetation from any variation of these two bypass alternatives.

2.2.5.3 Eight Bypass Variations

In January and February 1999, 8 bypass variations of the 2 selected preliminary alternatives (Alternatives 2-5 and 2-6) described in Section 2.2.5.1 were developed in more detail and evaluated by the project team.

The 8 bypass variation alternatives included variations of double or triple box culverts to bypass the floodflows, as summarized below.

Bypass Variation 1. Covered, double-box culverts beginning at the San Fernando Street Bridge, with one outlet upstream from Coleman Avenue and one outlet downstream from Coleman Avenue.

Bypass Variation 2. Covered, triple-box culverts. There would be two culverts from the San Fernando Street Bridge with one outlet upstream from Coleman Avenue and one outlet downstream from Coleman Avenue. There would be one culvert from the confluence with Los Gatos Creek to upstream from Coleman Avenue. This bypass variation, as well as Variation 3, is essentially the same as the Extended Bypass Alternative identified in Section 2.2.5.4, "An Additional Alternative Considered for CEQA Purposes."

Bypass Variation 3. Covered, double-box culverts, with one culvert running from the San Fernando Street Bridge to downstream from Coleman Avenue and one culvert running from the San Fernando Street Bridge to upstream from Coleman Avenue. There would be an additional entrance at the confluence with Los Gatos Creek (same as Variation 2, except two culverts were combined into one). This bypass variation, as well as Variation 2, is essentially the same as the Extended Bypass Alternative identified in Section 2.2.5.4, "An Additional Alternative Considered for CEQA Purposes".

Bypass Variation 4. Covered, triple-box culverts, with two box culverts from Santa Clara Street to upstream from Coleman Avenue and one box culvert from St. John Street to upstream from Coleman Avenue. The Bypass System and the Refined Bypass System Alternatives, identified below in Section 2.2.5.3, "Screening of the Eight Bypass Variations," are hybrids of bypass variations 4, 6, 7, and 8.

Bypass Variation 5. Covered, double-box culverts, with one box culvert from upstream from San Fernando Street to downstream from Julian Street and one box culvert from downstream from San Fernando Street to downstream from Julian Street.

Bypass Variation 6. Covered, double-box culverts, with one box culvert from upstream from St. John Street to upstream from Coleman Avenue. The Bypass System and the Refined Bypass System Alternatives, identified below in Section 2.2.5.3, "Screening of the Eight Bypass Variations," are hybrids of bypass variations 4, 6, 7, and 8.

Bypass Variation 7. Covered, double-box culverts, with one box culvert from upstream from Santa Clara Street to downstream from Coleman Avenue and one box culvert from upstream from Santa Clara Street to upstream from Coleman Avenue. The Bypass System and the Refined Bypass System Alternatives, identified below in Section 2.2.5.3, "Screening of the Eight Bypass Variations," are hybrids of bypass variations 4, 6, 7, and 8.

Bypass Variation 8. Covered, triple-box culverts, with one box culvert from upstream from Santa Clara Avenue to downstream from Coleman Avenue, one box culvert from upstream from Santa Clara Street to downstream from Coleman Avenue, and one box culvert from the confluence with Los Gatos Creek to upstream from Coleman Avenue. The Bypass System and the Refined Bypass System Alternatives, identified below in Section 2.2.5.3, "Screening of the Eight Bypass Variations," are hybrids of bypass variations 4, 6, 7, and 8.

2.2.5.4 Screening of the Eight Bypass Variations

The 8 bypass variations, plus the Authorized Project with additional mitigation and the No-Action alternative were ranked by a multiple agency technical advisory group. This multi-disciplinary group used the weighted selection criteria listed below that includes a mix of environmental, engineering, and hydraulic considerations and constraints. For each criterion, an alternative could receive a score of 1 (best) to 3 (lowest). The individual criterion scores were then multiplied by the weighting factors and summed to get the total score for each bypass variation (Table 2.2-2).

(1) Trail Access/Recreation – least disruptions of trails by inlets and outlets to culvert (weight=2)
(2) Caltrans coordination – alignment through piers (weight=2)
(3) Impacts to SRA cover/bank armoring – less armoring gets better score (weight=1)
(4) Fish passage/channel armoring – less armoring gets better score (weight=1)
(5) Operation and maintenance – minimize number of inlets and amount of armoring (weight=2)
(6) Schedule – easiest to get approval; Corps/Caltrans; less work in channel results in shorter construction because can work year round (weight=1)
(7) Constructibility – Caltrans/Sobrato; lower number of inlets (weight=2)
(8) Consistency with previous alternatives – begin bypass at Santa Clara street (weight=2)
(9) Right-of-Way constraints – Caltrans permit; downstream from New Julian Street (weight=3)

(10) Hydraulic/energy balance/sediment – energy balance; combined large culvert undesirable; begin at Santa Clara Street; eliminate peaks; ease of diverting water at San Fernando Street (weight=1)

(11) UPRR coordination – culvert through Coleman is better; channel widening downstream from New Julian (weight=2)

The bypass variations were next ranked by giving each variation a score of 1 (best) to 3 (lowest), using additional environmental criteria supplied by the resource agencies (Table 2.2-3). The variations were also ranked in the same manner using the Water Resources Council (Corps of Engineers, 1996) criteria of completeness, effectiveness, efficiency, and acceptability (Table 2.2-4). The summary scores for the variations are given in Table 2.2-5.

Of the 8 bypass variations described above, 4 variations (4, 6, 7, and 8) were selected, based on having the least total adverse effects, to carry forward to plan formulation. The Bypass System and Refined Bypass System Alternatives are hybrids of these 4 variations and are summarized below and are carried forward for detailed assessment, along with the No-Action Alternative, through the remainder of this report.

The Bypass System Alternative, shown in Figures 3.4-1 and 3.4-2, would include the following elements:

- Construction and operation of an underground bypass system to convey floodwaters around important riparian habitat in Segments 3A and 3B
- Additional onsite mitigation plantings in Segments 3A and 3B

TABLE 2.2-2. Weighted Ranking of Bypass Variations, Authorized Project with Additional Mitigation, and No-Action Alternative

	Criteria											
Bypass Variation	**Trail Access/ Recreation**	**Caltrans Coordination**	**Impacts to SRA Cover/Armoring**	**Fish Passage/ Channel Armoring**	**Operation and Maintenance**	**Schedule**	**Constructability**	**Consistency with previous alternatives**	**ROW constraints**	**Hydraulic/ energy balance/ sediment**	**UPRR coordination**	**Total**
1	3	3	1	1	1	3	3	3	3	2	1	**44**
2	3	3	2	2	2	3	3	3	3	1	1	**47**
3	3	3	2	2	2	3	3	3	3	2	1	**48**
4	1	1	2	2	3	2	2	2	1	1	2	**32**
5	2	3	3	3	3	3	3	3	2	2	3	**51**
6	1	1	3	3	3	1	1	1	1	2	2	**30**
7	2	1	1	1	1	1	1	1	1	2	1	**22**
8	2	1	2	2	2	2	2	2	1	1	1	**30**
Auth. Proj. w/mitigation	3	3	3	3	3	3	3	3	3	3	3	**57**
No Action	3	3	3	3	3	3	3	3	3	3	3	**57**

TABLE 2.2-3. Ranking of Bypass Variations, Authorized Project with Additional Mitigation, and No-Action Alternative by Resource Agency Criteria

Bypass Variation	Water Temperature	Rearing Habitat/Refuge	Required Mitigation	Total
1	1	2	1	**4**
2	2	1	2	**5**
3	2	1	2	**5**
4	2	2	2	**6**
5	3	3	3	**9**
6	3	3	2	**8**
7	1	2	1	**4**
8	2	1	2	**5**
Auth. Proj. w/mitigation	3	3	3	**9**
No-Action	3	3	3	**9**

TABLE 2.2-4. Ranking of Bypass Variations, Authorized Project with Additional Mitigation, and No-Action Alternative by Corps of Engineers Criteria

Bypass Variation	Completeness	Effectiveness	Efficiency	Acceptability	Total
1	3	3	3	3	**12**
2	1	1	3	3	**8**
3	1	1	3	3	**8**
4	1	1	2	2	**6**
5	3	3	2	3	**11**
6	3	2	2	3	**10**
7	3	2	1	3	**10**
8	1	1	2	2	**6**
Auth. Proj. w/mitigation	3	3	3	3	**12**
No-Action	3	3	3	3	**12**

TABLE 2.2-5. Summary Ranking of Bypass Variations, Authorized Project with Additional Mitigation, and No Action Alternative

Bypass Variation	Weighted Score	Resource Agency Score	Corps' Score	Total
1	44	4	12	**60**
2	47	5	8	**60**
3	48	5	8	**61**
4	32	6	6	**44**
5	51	9	11	**71**
6	30	8	10	**48**
7	22	4	10	**36**
8	30	5	6	**41**
Auth. Proj. w/mitigation	57	12	12	**81**
No-Action	57	12	12	**81**

- Expanded offsite mitigation in Reach A Mitigation Site and Guadalupe Creek Mitigation Site
- Decrease in amount of bank and river bottom armoring, new low-flow channel design in the armored sections, addition of invert-stabilization-structures to arrest erosion and improve habitat
- Relocation of pedestrian trails/maintenance roads to accomplish habitat and recreation goals
- Construction of flood training walls in Segment 3C Phase 3
- Operation and maintenance of the entire Guadalupe River Project, including mitigation measures

Segment 3A is between Coleman Avenue and New Julian Street. Segment 3B extends from New Julian Street to Park Avenue. Segment 3C Phase 3 is at the upstream end of the project, near I-280. The Bypass System Alternative would include construction of flood protection in Segments 3A and 3B from 2002 through 2004. In Segment 3C Phase 3, flood protection construction would occur in 2003 and 2004. Installation of riparian vegetation mitigation plantings began in 1994 and was completed in 1999. Installation of SRA cover vegetation mitigation plantings in these segments began in 1999 and would continue through 2004. Installation of anadromous fish habitat mitigation began in 1994 and would continue through 2004 (U.S. Army Corps of Engineers, 1992).

2.2.5.5 Additional Alternatives Considered

The preceding discussion addressed the iterative process that was used to develop, assess, and refine alternative plans to meet the stated objectives for project modification. In February 2000, the Corps and SCVWD determined that additional alternatives would be considered which would avoid or substantially lessen the significant effects of the Bypass System Alternative to further ensure compliance with CEQA Guidelines 15126.6[a].

Refined Bypass System Alternative. The Refined Bypass System Alternative, shown in Figure 3.5-1, includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank in the vicinity of the

New Julian Street Bridge. The Refined Bypass System Alternative would reduce impacts to riparian vegetation and SRA cover vegetation by 0.35 acre and 72 lf, respectively. The east bank recreation trail would cross New Julian Street at grade rather than passing under the bridge. The Refined Bypass System Alternative would include the same environmental commitments identified in Chapter 3 for the Bypass System Alternative.

Extended Bypass Alternative. The Extended Bypass Alternative would include all the flood protection components that would be constructed as part of the Bypass System Alternative except the upstream inlets to the bypass culverts would be moved upstream near the outlet of the Woz Way to Park Avenue bypass. The bypass culverts would cross under San Fernando and West Santa Clara Streets and under State Route 87, where they would rejoin the alignment described for the Bypass System Alternative. The length of the bypass culverts would increase by approximately 2,000 feet. The Extended Bypass Alternative would result in approximately 2,732 lf less channel bank armoring than the Bypass System Alternative and approximately 1,216 lf less river bottom armoring. The Extended Bypass Alternative would reduce impacts to riparian vegetation and SRA cover vegetation by 2.27 acres and 1,628 lf, respectively.

2.3 Summary of Preliminary Alternative Screening and Rationale

Under NEPA, the range of alternatives required in an EIS is governed by a "rule of reason." Alternatives that do not meet the project's purpose and need or do not satisfy the lead agency's criteria with regard to economic feasibility, environmental considerations, and technical feasibility, need not to be evaluated in the EIS. In addition to reasonable alternatives, NEPA also requires the lead agency to assess the no-action alternative.

Under CEQA, the range of alternatives required in an EIR is also governed by the same basic "rule of reason" as NEPA, requiring that an EIR address only those alternatives necessary to permit a reasoned choice. The discussion of alternatives must include alternatives that are capable of avoiding or substantially lessening the significant environmental effects of the Bypass System Alternative, even if the alternative could impede to some degree the attainment of all of the project objectives. CEQA also requires that the lead agencies analyze the No-Action Alternative.

As described in Section 2.2, "Preliminary Screening," the development of the alternatives evaluated in this Report was based on an extensive and thorough screening process. The Corps and SCVWD developed a set of criteria designed to screen out possible alternatives that fell outside of the "reasonable range." Selection of practicable alternatives was based on the assessment of their potential environmental, economic, and social effects using (1) Federal/Corps planning principals and guidelines for plan formulation and evaluation (Section 2.1.2) and (2) other screening criteria developed by the Corps and SCVWD, pursuant to NEPA and CEQA requirements (Section 2.2.5). There are the only two practicable alternatives that fulfill the stated objectives and criteria pursuant to the requirements of both CEQA and NEPA. The Bypass System Alternative includes a covered bypass system on the eastern bank of the river beginning near West Santa Clara Street and ending in the vicinity of Coleman Avenue. The Refined Bypass System Alternative includes all the flood protection improvements of the Bypass System Alternative except for 200 lf of armoring (gabions) of the east bank and the associated recreation trail underpass beneath the New Julian Street Bridge. Without these features, existing SRA and riparian vegetation would remain along this 200 lf reach, and the recreation trail would continue to be at street level. The Bypass System and Refined Bypass System Alternatives are described in detail in Chapter 3 of the Report.

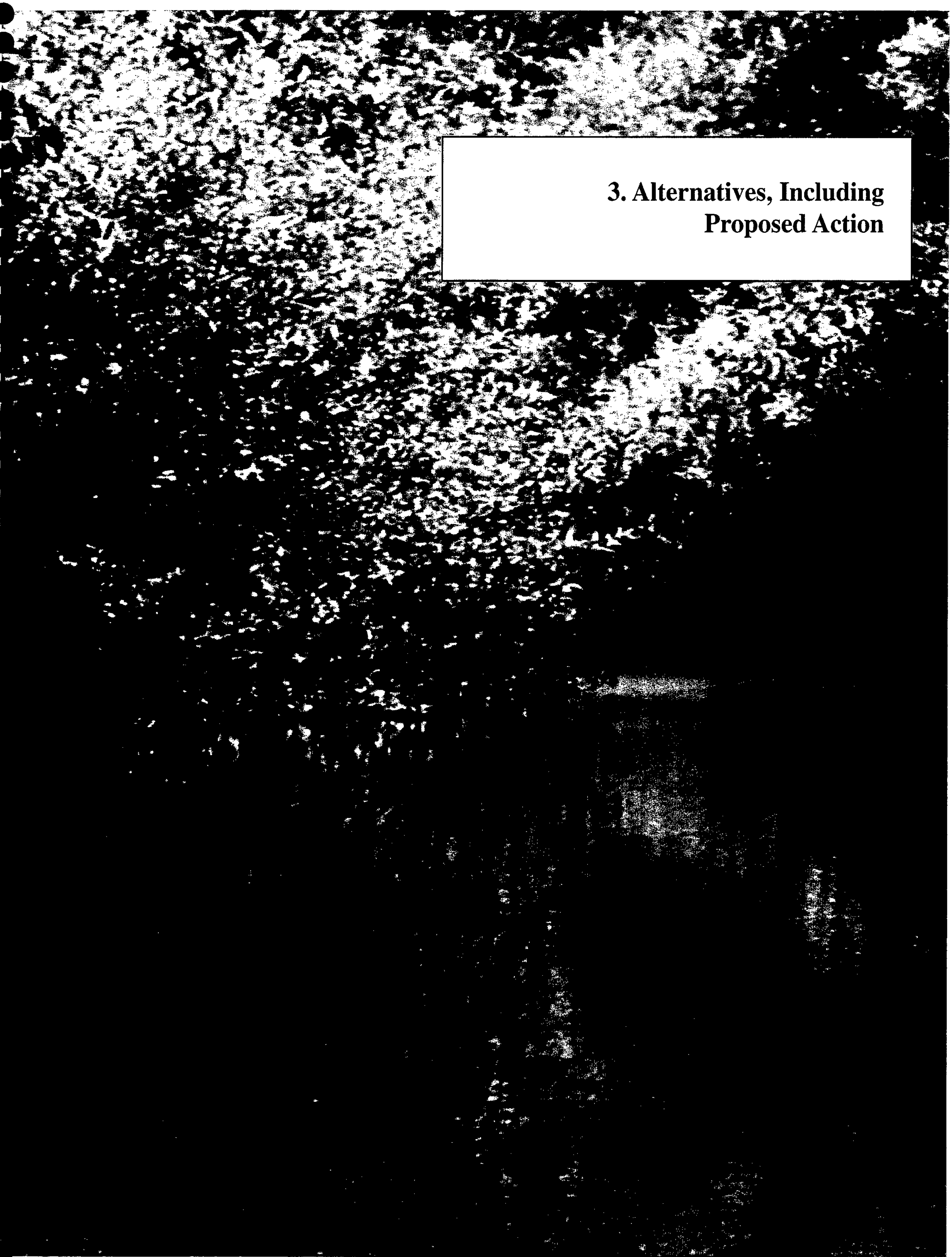
The Corps and SCVWD have determined, to ensure CEQA compliance, that an additional alternative will be considered which would avoid or substantially lessen the significant effects of the Bypass System Alternative - the Extended Bypass Alternative.

The Extended Bypass Alternative would move the inlets to the bypass system upstream from San Fernando Street to the vicinity of the outlet from the Woz Way to Park Avenue Bypass Reach. The Extended Bypass Alternative is similar to bypass variations 2 and 3. The analysis and ranking of those two variations (Section 2.2.5.2) would apply to the Extended Bypass Alternative.

The Extended Bypass Alternative is considered in this Report for comparison purposes because, consistent with CEQA purposes, it would result in less adverse environmental impacts than the Bypass System Alternative. However, it is recognized that the Extended Bypass Alternative would not be feasible or meet all of the project objectives and the screening criteria (Section 2.2.5), including schedule, constructability, right-of-way, Caltrans coordination, and exceedingly high costs. It is estimated that the additional cost of the Extended Bypass Alternative would be $40 to $100 million greater than the Bypass System Alternative. Section 5.16, "An Analysis of an Additional Alternative Considered for CEQA Purposes," includes an analysis of the potential effects of the Extended Bypass Alternative to more fully assess the practicability of this alternative.

The alternative plans that were selected from the preliminary screening process described in this chapter are discussed further in Chapter 3 and their potential effects are assessed in the remainder of the report.

The Corps and SCVWD have selected the Refined Bypass System Alternative as the Proposed Action. The Refined Bypass System Alternative is the environmentally preferred alternative.



3. Alternatives, Including Proposed Action

KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions in Chapter 3:

Additional information is provided in Section 3.4.3 on the Soil Management Plan used to test excavated soil during the construction period for constituents of concern and on the construction period Groundwater Dewatering and Treatment Plan.

The Refined Bypass System Alternative is now identified as the Proposed Action alternative. This change was made after the Refined Bypass System Alternative was found to be environmentally superior, environmentally preferable, and less costly during the lead agencies' review of the Draft Report. Chapter 3 provides details on this revision.

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative, except that: (1) river bank armoring in the vicinity of the New Julian Street Bridge is 200 linear feet less than under the Bypass System Alternative because the recreation trail would not extend under the New Julian Street Bridge; (2) project impacts to visual resources would be slightly less with the Refined Bypass System Alternative because there would be less bank armoring; (3) project impacts on SRA would be slightly less with the Refined Bypass System Alternative; (4) project effects on riparian-wildlife habitat resources are therefore slightly less with the Refined Bypass System Alternative, but; (5) the Refined Bypass System Alternative would result in slightly more impact to recreation and to public access.

The following additional information is also provided:

- An additional figure (3.4-6a) to show the design of the bypass system's inlet structures.
- Additional information for the proposed west bank channel widening downstream from West Santa Clara Street.
- Additional information about the Operation and Maintenance elements of the Proposed Action.
- A revised Project Construction Schedule indicating that construction of the Proposed Action will be completed in 2004.

Specific responses to comments on the Draft Report are presented in Appendix 4 (Volume 2) with highlights and strikeouts showing where portions of the Draft Report were modified as reflected in this Final Report.

CHAPTER 3

Alternatives, Including the Proposed Action

3.1 Introduction

This chapter describes the project alternatives evaluated in detail in this Report, with emphasis on the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative (Proposed Action). Chapter 2 describes the full range of alternatives considered, including those that have been eliminated from further detailed analysis. This chapter contains seven major sections that highlight the portions of the Guadalupe River Project that have been built and the assumptions behind the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative:

- 3.2 Completed Portions of the Authorized Project – Describes portions of the Guadalupe River Project, also known as the Authorized Project, that have been approved and completed
- 3.3 No-Action Alternative – Assumes the likely future conditions in the study area without implementation of the Proposed Action and is used to compare potential effects
- 3.4 Bypass System Alternative – Describes the proposed modifications to the Guadalupe River Project, including detailed construction features and environmental commitments
- 3.5 Refined Bypass System Alternative (Proposed Action)– Describes the proposed modifications to the Bypass System Alternative, which consist of reducing the amount of bank armoring (gabions) and replacing the proposed pedestrian undercrossing at New Julian Street with an at-grade crossing
- 3.6 Comparison Summary of Project Features – Includes a table comparing the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative
- 3.7 Additional Alternatives Considered for CEQA Purposes – Describes an additional CEQA alternative
- 3.8 Identification of the Environmentally Preferred and Environmentally Superior Alternative – Provides the rationale behind the selection of the environmentally preferred and environmentally superior alternative

Some definitions are provided below to explain the terms used in the following sections.

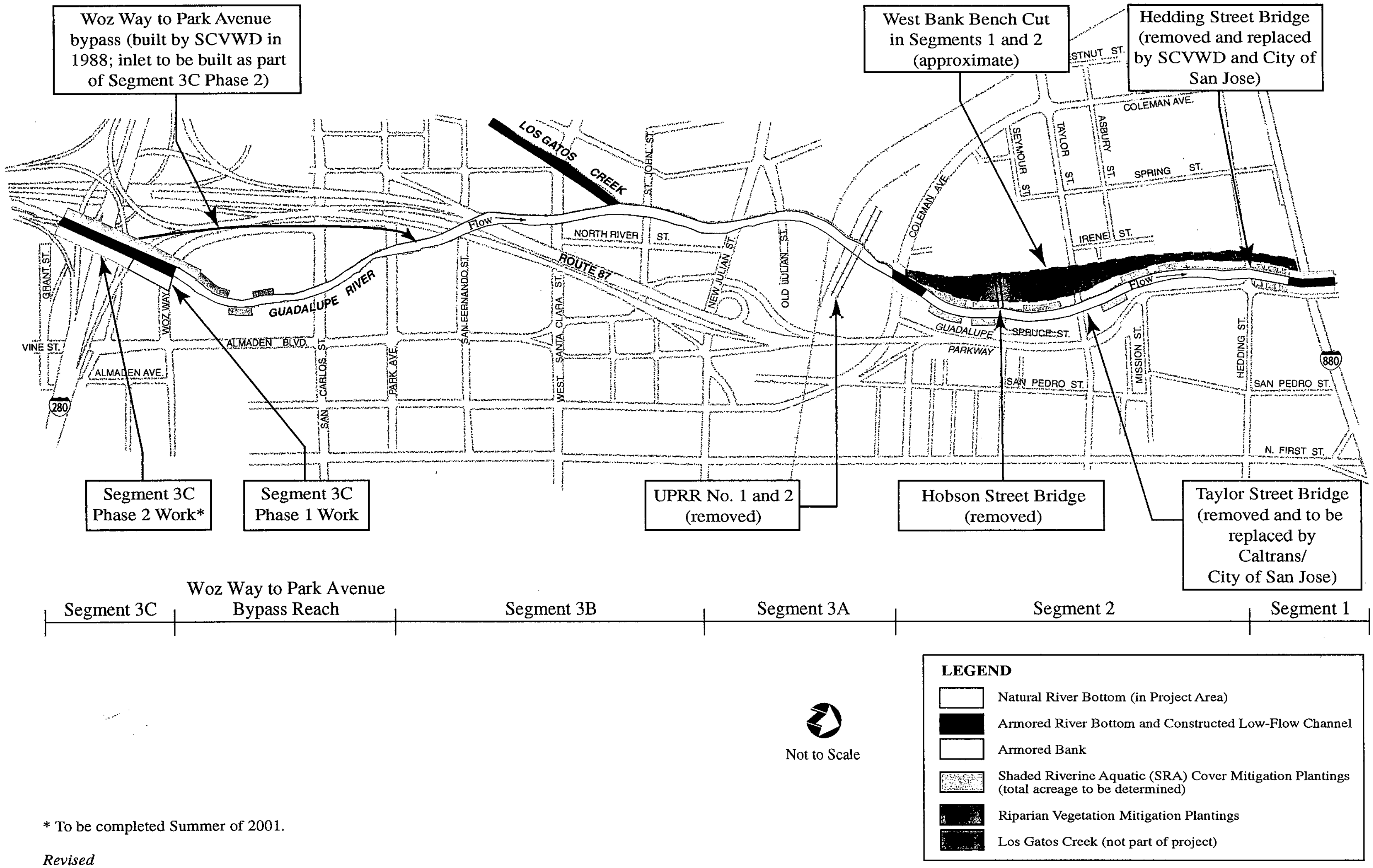
- **Armoring** – The use of structural techniques to direct and control the flow of a river and prevent riverbank and channel bed erosion. Structural techniques range from complete

concrete-wall channelization of a river to the placement of gabions and concrete cellular mattress (CCM). The type and quantity of armoring are dependent on expected floodflows and hydraulic conditions in the reach under construction.

- **Bypass** – A large underground culvert used to channel water around a section of a river channel. The bypass system would be box culverts that may range in dimension from 18.5 by 25.5 feet to 25.5 by 25.5 feet.
- **Concrete Cellular Mattress (CCM)** – Concrete blocks (open cell and closed cell) that are laid in an interlocking pattern and secured with cable. Typical CCM thickness is 6 inches. CCM is used to armor surfaces adjacent to various flood protection features and can be placed on slopes of varying steepness.
- **Concrete Masonry Unit (CMU)** – Precast concrete blocks.
- **Gabion** – A basket or cage filled with rocks; gabions are used in the construction of flood protection features. Gabions are custom-made in various sizes and shapes.
- **Gabion Terraces** – A set of gabion embankments with gabion infill placed between the embankments. Terrace faces will typically range from 2 to 4 feet high, and terrace tops will range from 3 to 6 feet wide.
- **Stone Terraces** – A set of raised, concrete- or stone-faced embankments with a level top. Gabion infill is placed between each embankment. Terrace faces will typically range from 2 to 4 feet high, and terrace tops will range from 3 to 6 feet wide.
- **Trail/Maintenance Road** – A dual-purpose project feature that serves as a trail but is also constructed with enough durability to support trucks and maintenance vehicles. Trail/maintenance roads would be 18 feet wide and include a 12-foot-wide asphalt surface bordered on each side with a 3-foot -wide strip of reinforced turf. Trails that could accommodate small maintenance vehicles would be 12 feet wide and include an asphalt surface.
- **Riparian Mitigation** – Trees, shrubs, and woody vegetation planted in soils that are saturated for a substantial portion of the year as compensation for previous effects on riparian vegetation.
- **SRA Cover Vegetation Mitigation** – Trees, shrubs, and woody vegetation planted in soils within 15 feet of waterways to shade aquatic habitat as compensation for previous effects on SRA cover vegetation.

3.2 Completed Portions of the Authorized Project

As explained in Sections 1.2.2, "Description of Authorized Project," and 1.2.3, "Status of Authorized Project," construction of the Authorized Project began in 1992. Flood protection components in Segments 1, 2, and 3C Phase 1 have been completed (Figure 3.2-1). The flood protection and recreation components in Segments 1 and 2 were completed in 1994 and 1996, respectively; the flood protection components in Segment 3C Phase 1 were completed in 2000. Riparian mitigation for Segments 1 and 2 has also been completed. Flood protection components and mitigation in Segments 1, 2, and 3C Phases 1 and 2 were addressed in previous environmental documents (U.S. Army Corps of Engineers, 1985, 1990, and 1991a).



* To be completed Summer of 2001.

Revised

Figure 3.2-1. Guadalupe River Project (No-Action Alternative)

Completed construction activities in Segments 1, 2, and 3C Phase 1 and the completed Woz Way to Park Avenue bypass are described below.

3.2.1 Segment 1

Segment 1 is located between I-880 and Hedding Street (Figure 3.2-1). Construction of Segment 1 began in August 1992 and was completed in August 1994; riparian mitigation for Segment 1 is complete, and SRA mitigation and other mitigation described in the MMP will be completed in 2001. The completed flood protection and recreation features reflect the Authorized Project design (U.S. Army Corps of Engineers, 1991b).

Flood protection elements constructed in Segment 1 include 448 feet of gabion armoring on the western and eastern banks and CCM armoring on the channel bed at the downstream end of the reach under the I-880 Bridge. The 448 feet of armored channel bed include a low-flow channel to provide fish passage during low flows. The low-flow channel is a design that was developed by CDFG and contains weirs and pools (U.S. Army Corps of Engineers, 1991b).

To accommodate high-water flows above 350 cfs, a secondary channel and a floodplain terrace containing riparian mitigation sites and recreational trails were created on the western bank of the river (Figure 3.2-2). The floodplain terrace is approximately 30 acres. Five of these acres are located in Segment 1. A narrow channel was excavated in the floodplain terrace between Coleman Avenue and I-880. This feature is discussed in further detail below under "Segment 2."

Recreational features on the western bank include a trail system, park benches, picnic tables, and trash receptacles. In Segment 1, a network of trails was offset 40 to 180 feet from the riparian mitigation sites and existing riparian habitat along the river. The recreation trails are interspersed with trees and grassy knolls to form an urban park setting. The trails are 12 feet wide. The west bank trail crosses under the I-880 and Hedding Street bridges and has access points upstream from the I-880 Bridge and upstream and downstream from Hedding Street. On the eastern bank, a trail/maintenance road crosses under I-880. The trail/maintenance road under I-880 will connect with the proposed trail that will be constructed on top of the eastern bank as part of the Caltrans State Route 87 Freeway Upgrade Project currently under construction.

3.2.2 Segment 2

Segment 2 is located between Hedding Street and Coleman Avenue (Figure 3.2-1). Construction of Segment 2 began in July 1994 and was completed in September 1996; riparian mitigation for Segment 2 is substantially complete, and SRA mitigation and other mitigation described in the MMP will be completed in 2001. The completed flood protection and recreational features reflect the Authorized Project design (U.S. Army Corps of Engineers, 1991b).

Flood protection elements in Segment 2 include 305 feet of armoring at the upstream end of the reach, below the Coleman Avenue Bridge. Armoring in this reach includes gabions at the toe slope on the western and eastern banks and CCM in the channel bed. The area of armored channel bed includes a low-flow channel to provide fish passage. The low-flow channel design was developed by CDFG and contains weirs and pools. Both the eastern and western banks of Segment 2 were disturbed in 1994, when the Hobson Street Bridge was

removed to provide hydraulic capacity for the Authorized Project, and again in 1996, when SCVWD and the City of San Jose removed and then replaced the Hedding Street Bridge (Figure 3.2-1). On the western bank, a sewerline was capped at Hobson Street and rerouted to Taylor Street.

Removal of the Taylor Street Bridge in 1998 also disturbed both the eastern and western banks. These bridge removals and replacements have been documented in previous environmental reports (U.S. Army Corps of Engineers, 1985 and 1991a).

To accommodate high water flows in Segment 2, a floodplain terrace consisting of riparian mitigation sites and recreational trails was created adjacent to the western bank of the river approximately 3 feet above the mean summer water level (Figure 3.2-2). The total floodplain terrace is approximately 30 acres. Of these acres, 25 are located in Segment 2. The entire floodplain terrace in Segments 1 and 2 floods temporarily during high-flow conditions.

A strip of vegetation 30 feet wide between the river and the floodplain terrace was left unexcavated in Segment 2 to preserve existing riparian vegetation that provides SRA cover vegetation. This resulted in a berm immediately adjacent to the main river channel that is 6 feet higher than the adjacent floodplain terrace on the western bank. Several breaks in the berm create low spots where floodflows spill over the bank; the floodflows then drain back to the main river channel when riverflows recede.

A narrow channel was also excavated in the floodplain terrace on the western bank between I-880 and Coleman Avenue. This secondary channel was designed to improve the quality of habitat in the riparian mitigation sites located in Segments 1 and 2. The secondary channel was also designed to prevent ponding in the floodplain terrace by directing water out of this area and back into the main river channel, thereby minimizing the potential for fish to become stranded in the floodplain terrace. The inlet for the secondary channel is immediately downstream from Coleman Avenue in Segment 2, and the outlet is approximately 300 feet upstream from I-880 in Segment 1. The bottom of the secondary channel inlet is nearly 2 feet higher than the channel bed at the same location. The secondary channel has a bottom width of 5 feet and a top width of 13 feet; it is 4 feet deep and approximately 5,100 feet long. Water flows into the secondary channel when flows in the river reach approximately 350 cfs.

A rock weir was placed across the upstream end of the secondary channel. The weir is constructed of boulders ranging from 2 to 6 feet in diameter that interlock and provide a smooth transition to the CCM in the natural river channel downstream from Coleman Avenue (Santa Clara Valley Water District, 1997). A gap at the entrance of the secondary channel, perpendicular to the flow, allows water to enter the secondary channel. It is intended to retain sediment in the natural channel and has performed as expected. For flows less than 2,000 cfs, approximately 20 percent of the flow is diverted to the secondary channel in the floodplain terrace, and the remaining 80 percent remains in the main river channel (Reiller, pers. comm.). At flows greater than 2,000 cfs, progressively more water is diverted into the secondary channel and floodplain terrace. By helping to concentrate flows of less than 1,000 cfs in the main river channel, the rock weir maintains sediment transport in the river, minimizes the deposition of sediment, and protects mitigation plantings in the floodplain terrace from routine storm events.

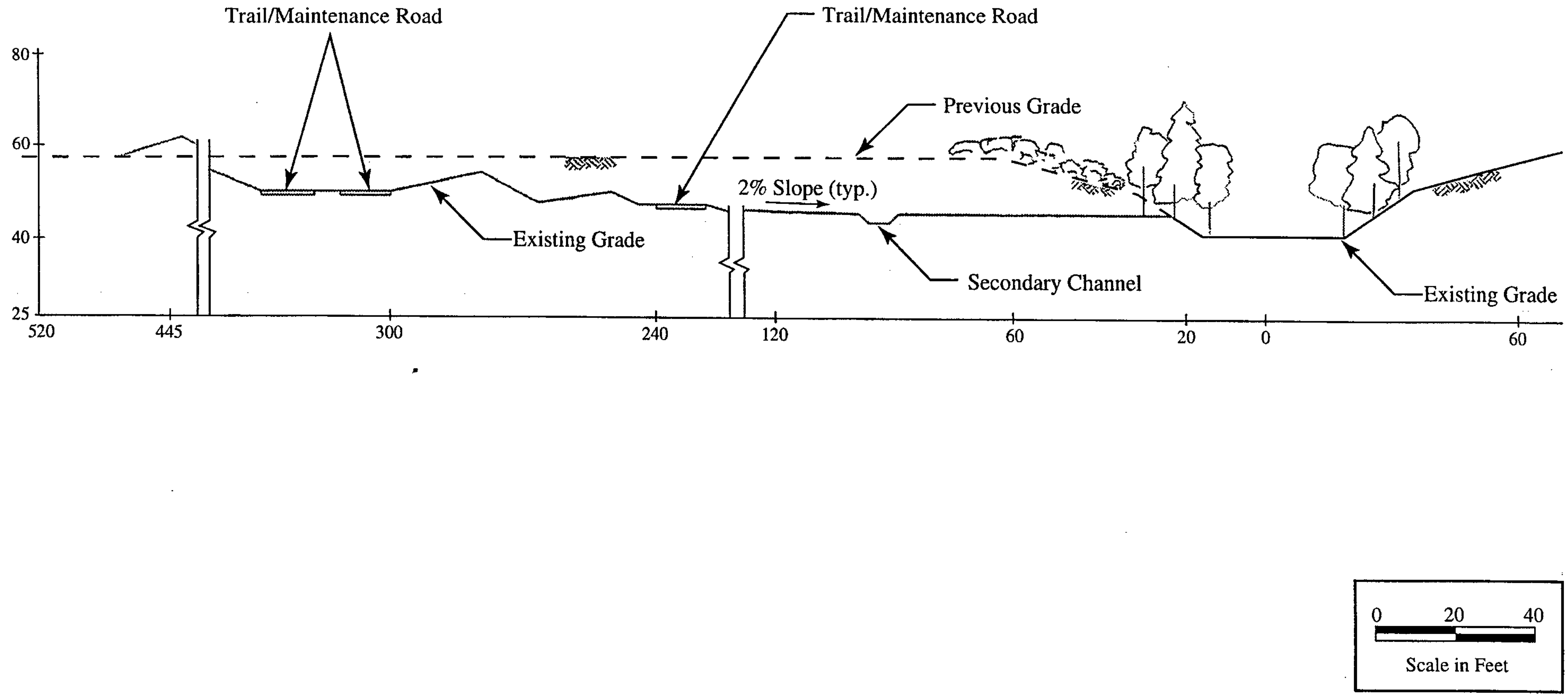


Figure 3.2-2. Guadalupe River Project Segments 1 and 2 Cross Section

To confirm that the secondary channel is operating correctly and does not cause the stranding of steelhead or chinook salmon, the Corps and SCVWD must monitor flows at the rock weir. Specifically, the flow split at the weir structure must be maintained as described above; as flows decrease below 2,000 cfs, the secondary channel must maintain a connection sufficient to enable fish to move back into the main river channel.

Current secondary channel maintenance practices include the removal of vegetation and sediments. This ensures that water does not pond in the floodplain terrace or within the secondary channel. Vegetation is removed in accordance with the U.S. Army Corps of Engineers Interim Operation and Maintenance Manual (U.S. Army Corps of Engineers, 1997). Storm drains from adjacent streets to the west of the river now empty into the secondary channel.

Recreational elements in Segment 2 include a trail system on the western bank and a trail on the eastern bank. These recreational features are set back 120 to 250 feet from riparian mitigation sites and the habitat along the river. The western bank network of trails is interspersed with trees and grassy knolls to form an urban park setting. The western bank trails merge to cross under the Taylor Street and Coleman Avenue bridges. Trail access points on the western bank are located upstream and downstream from the Taylor Street Bridge and downstream from the Coleman Avenue Bridge. The eastern bank trail is located just under and downstream from Coleman Avenue and is part of the proposed Caltrans/City of San Jose State Route 87 eastern bank trail currently under construction. This trail would connect to the Segment 1 eastern bank trail.

3.2.3 Segment 3C Phase 1

Segment 3C Phase 1 work is on the eastern bank between Woz Way and the I-280/State Route 87 interchange (Figure 3.2-1). Approximately 355 feet of the eastern bank was armored with gabions and stone terraces from under the Woz Way Bridge to 50 feet downstream from the I-280 South/State Route 87 connector ramp. A stairway was constructed on the eastern bank upstream from the Woz Way Bridge to allow access to the lower trail/maintenance road system. Segment 3C Phase 1 construction began in mid-September 1999 and ended in late 2000. Work within the river channel was completed by November 1, 1999.

3.2.4 Bridge Removal

In Segment 3A, the UPRR No. 1 and 2 bridges were removed in 1996 to meet the hydraulic capacity requirements for the Authorized Project.

3.2.5 Reach A Mitigation Site

The Reach A mitigation site is immediately downstream from the Guadalupe River Project area, between I-880 and Airport Parkway. The mitigation site is bordered on the east by the Guadalupe Parkway and on the west by San Jose International Airport. Where plants would experience high average floodflow velocities and shear stresses, SCVWD installed five pilot planting sites during winter 1998-99 to address concerns about the feasibility and sustainability of SRA mitigation plantings. Each pilot planting site was approximately 310 feet by 15 feet, providing a total of 1,543 lf of SRA cover vegetation. These pilot planting sites were located on the banks and benches and were monitored in 1999 and 2000. Plantings are healthy and undamaged by winter flows.

Reach A will also be used for the Caltrans/City of San Jose State Route 87 mitigation. The State Route 87 mitigation is located higher on banks and will not provide SRA cover vegetation. These mitigation areas and the Guadalupe River Project mitigation areas will not overlap in Reach A.

3.2.6 Guadalupe Creek Mitigation Plantings

Planting was done along 1,263 lf of Guadalupe Creek downstream from Masson Dam in 1998 to compensate for impacts on SRA habitat resulting from the construction of portions of the Guadalupe River Project. The plantings were done on both sides of the creek 660 feet downstream from Masson Dam and continued downstream for 780 feet. Planting sites in Guadalupe Creek were located on low benches with year-round soil moisture and on higher benches where plant species preferring drier conditions, such as oaks, were planted. This SRA mitigation and future Guadalupe River Project SRA mitigation plantings on Guadalupe Creek would include a portion of the Guadalupe Creek Restoration Project, which is located between Masson Dam and Almaden Expressway (Section 1.6.9, "Guadalupe Creek Restoration Project").

3.2.7 Woz Way to Park Avenue Bypass

The Woz Way to Park Avenue bypass is an integral part of providing flood protection to downtown San Jose by helping convey floodflows. The Woz Way to Park Avenue bypass was constructed in 1988 by SCVWD and is 2,900 feet long. The inlet and outlet to the bypass were not constructed because the bypass will not be operated until the downtown Guadalupe River Project is completed. The No-Action Alternative includes construction of the inlet as described in Section 3.3.2, "Construction Features," and the Bypass System Alternative includes construction of the outlet as described in Section 3.4.2.2, "Riverbank and Channel Bed Armoring." The Bypass System Alternative also includes the opening and operation of the Woz Way to Park Avenue bypass.

3.3 No-Action Alternative

3.3.1 Definition

A No-Action Alternative is required pursuant to NEPA, and a no-project alternative is required for CEQA. Herein called the No-Action Alternative, this alternative assumes "existing conditions" and the "likely future conditions" in the project area without implementation of the Proposed Action. Likely future conditions include planting of riparian vegetation, planting of SRA cover vegetation, and the replacement of spawning gravels needed to compensate for water temperature and fish and wildlife habitat effects associated with the completed Segments 1, 2, and 3C Phase 1. Another likely future condition includes construction of Segment 3C Phase 2 and associated mitigation, beginning in 2001 and finishing in 2002. Under the No-Action Alternative, the Authorized Project would not be completed, objectives for flood and environmental protection would not be met, and an unacceptable public health and safety hazard—potential flooding in downtown San Jose—could occur.

3.3.2 Construction Features

Completed portions of the No-Action Alternative are explained in Section 3.2.1, "Completed Components." Additional construction activities under the No-Action Alternative include completion of Segment 3C Phase 2. Remaining construction activities for Segment 3C Phase 2 are described below. Although construction of Segments 1, 2, and 3C Phase 1 has been completed and construction of Segment 3C Phase 2 is scheduled to start in fall 2000, mitigation to offset environmental effects is ongoing. Mitigation requirements include planting SRA cover vegetation, placing spawning gravel, and monitoring project effects. The specific mitigation measures applicable to the No-Action Alternative are described in Section 3.3.3, "Environmental Commitments."

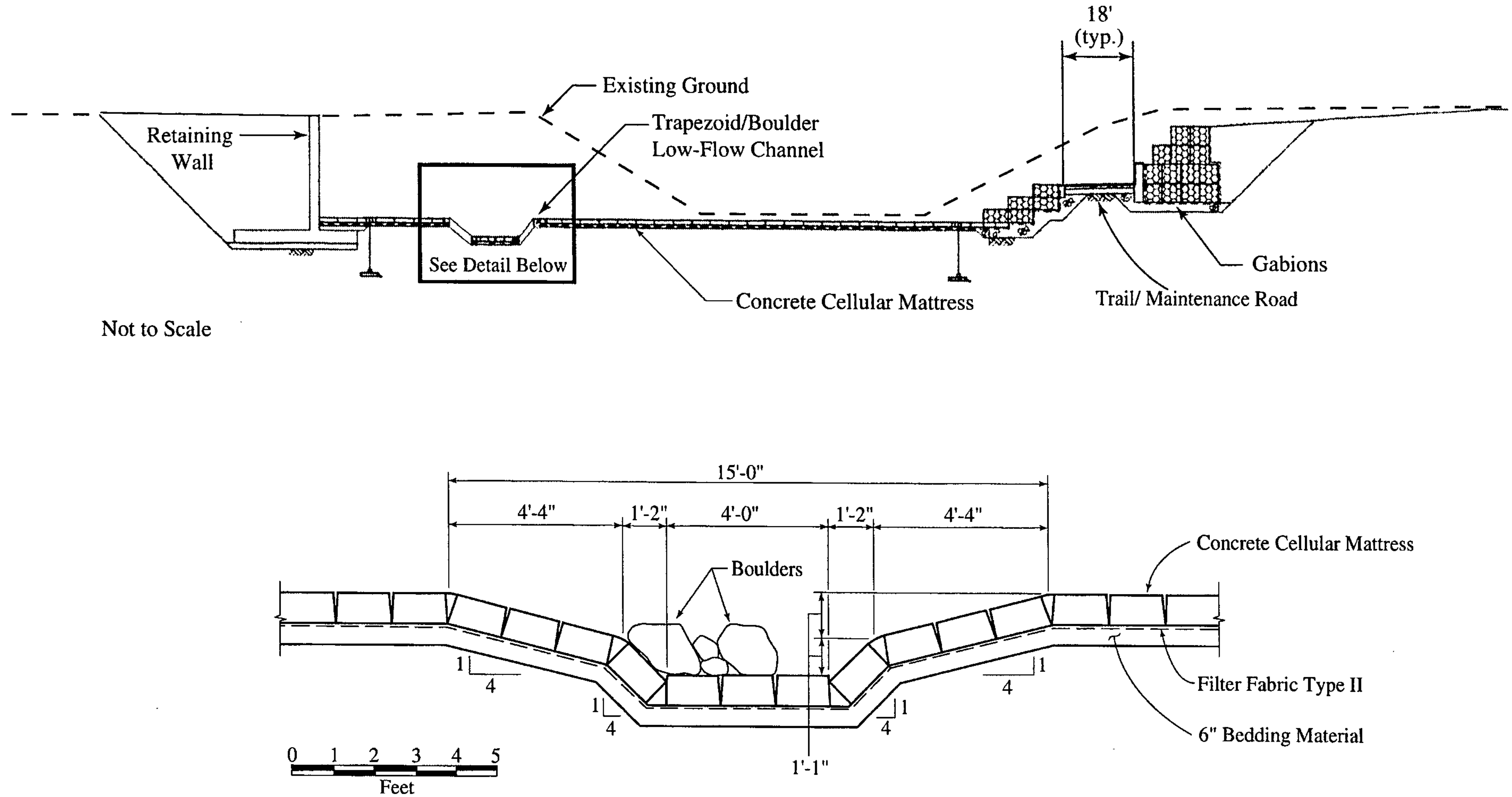
Segment 3C Phase 2 is between the upper limit of Segment 3C Phase 1 and Grant Street and includes the area of the Guadalupe River under I-280 (Figure 3.2-1). On the western bank, 1,250 feet of armoring would be constructed under the No-Action Alternative. Gabions would be installed at the toe of the slope, and stone terraces would be installed on the bank downstream from the inlet to the Woz Way to Park Avenue bypass reach to Woz Way. The inlet structure for the existing Woz Way to Park Avenue bypass reach would be constructed as part of 3C Phase 2. A concrete weir would be constructed at the inlet to control when flows enter the bypass. A bulkhead retaining wall would be placed over the inlet to the bypass; this bulkhead would block the passage of water into the bypass until the entire Guadalupe River Project is operational. Upstream from the inlet, a retaining wall would be constructed.

On the eastern bank, armoring would extend from Grant Street north approximately 730 feet to the upstream edge of completed elements in Segment 3C Phase 1. Gabions would be placed at the toe of the slope, and stone terraces would be located on the riverbank. A 12-foot-wide trail/maintenance road would be integrated into the terraces along the armored bank between Grant Street and Woz Way.

The channel bed would be armored with CCM and concrete for 1,045 feet upstream from the Woz Way Bridge to Grant Street (Figure 3.3-1). The armored sections of channel bed would contain a trapezoid/boulder-style low-flow channel for fish passage. The low-flow channel has a trapezoidal shape; boulders are placed in the low-flow channel to increase water depth and provide hydraulic complexity (Figure 3.3-1). The trapezoid/boulder low-flow channel design would result in a thalweg water depth of greater than 0.8 feet (9.6 inches) when the flow is 4 cfs. Thalweg is the line of maximum depth in the channel (Leopold and Wolman, 1957). The boulders would be large enough, and possibly anchored, to ensure that they are not carried downstream by high flows.

A trail system would be constructed on the western bank in Segment 3C between Woz Way and I-280 and would include a top-of-bank trail and a trail 6 feet above the summer water level along the armored bank. A stairway and a handicap-access ramp would be constructed on the south side of the Woz Way Bridge on the western bank. The trail would continue upstream to the proposed Overlook Plaza on the western bank between Woz Way and I-280. The Overlook Plaza is included as part of the 3C Phase 2 construction. A trail/maintenance road system would be constructed on the eastern bank in Segment 3C between Woz Way and Grant Avenue. An at-grade ramp would be constructed to connect Grant Street to the east bank trail.

Construction of Segment 3C Phase 2 is scheduled to begin in 2001 and end in 2002. For both construction years, work within the channel bed would generally not begin before May 1 and would be completed by October 15.



Note:
Low-flow channel check structure not pictured.

Revised

Figure 3.3-1. General Cross Section of the Riverbank and Channel Bed Armoring in Segment 3C Phase 2 and Trapezoid/Boulder Low-Flow Channel Design

3.3.3 Environmental Commitments

The Authorized Project contains specific environmental commitments that would be implemented under the No-Action Alternative. These commitments are designed to offset the environmental effects associated with the completed portion of the Authorized Project, including the construction of 3C Phase 2. The environmental commitments include measures to avoid and minimize adverse project effects during construction and measures to compensate for adverse project effects and are equivalent to mitigation measures under CEQA.

3.3.3.1 Measures to Avoid and Minimize Adverse Project Effects during Construction

The environmental commitments designed to avoid and minimize adverse project effects during construction of 3C Phase 2 include limiting the construction period and implementing a vegetation protection plan, an SWPPP, an erosion and sediment control plan, a spill prevention and response plan, a soil management plan, a hazardous and toxic materials contingency plan, and a construction area fish management plan. All measures are in compliance with CDFG Streambed Alteration Agreement Notification No. III-403-91. Complete descriptions of these measures are detailed in Section 3.4.3.1, "Measures to Avoid and Minimize Adverse Project Effects During Construction."

3.3.3.2 Measures to Compensate for Adverse Project Effects

The environmental commitments designed to compensate for adverse project effects include planting and maintaining riparian vegetation; planting and maintaining SRA cover vegetation; protecting riparian and SRA cover vegetation mitigation; implementing water temperature measures; and replacing spawning gravel. Complete descriptions of these measures follow.

Planting of Riparian Vegetation. Construction in Segments 1, 2, and 3C Phases 1 and 2 resulted in the loss of 8.36 acres of riparian habitat. A total of 21 acres of riparian habitat mitigation has been established in Segments 1 and 2. In 1994 and 1999, approximately 4.0 acres of native riparian vegetation was planted in the bench-cut area on the western side of the river in Segment 1. In 1998, approximately 17.0 acres of native riparian vegetation was planted in the natural soil bench-cut areas on the western side of the river in Segment 2. Planting densities were approximately 244 trees per acre and 270 shrubs per acre. Species planted as part of the riparian vegetation mitigation program are native to the Guadalupe River area. Additional details are presented in Section 5.4.2, "No-Action Alternative."

Planting of SRA Cover Vegetation. Construction in Segments 1, 2, and 3C Phase 1 resulted in the loss of 3,753 lf of SRA cover vegetation, and construction of 3C Phase 2 will result in the loss of 773 lf of SRA cover vegetation. A total of 3,006 lf of SRA cover vegetation has been planted. Remaining required SRA cover vegetation will be determined after completion of an SRA HEP analysis for the No-Action Alternative. Additional details are presented in Section 5.4.2, "No-Action Alternative."

Protection of the Project's Compensatory Mitigation Components. The conditional water quality certification for the Guadalupe River Project issued by SWRCB in 1992 requires "specifications of how compensatory mitigation sites would be guaranteed protection in perpetuity from potential recreational and other urban impacts" (Condition 2.b.vii) (Appendix 1F). After a 3-year establishment period monitored by the Corps, SCVWD is responsible for the management and protection of all mitigation sites for the life of the Guadalupe River Project. No trails were constructed in the mitigation areas in Segments 1

and 2, and recreational use would be prohibited in both onsite and offsite riparian vegetation and SRA cover vegetation mitigation sites. However, because many of the onsite mitigation sites would be located near Guadalupe River Park, recreational activities, including nature viewing and walking/riding on trails, would take place in the vicinity of the mitigation sites. This would also be the case with the Guadalupe Creek mitigation site, where informal recreation in the form of walking and jogging occurs regularly along a levee/maintenance road that runs adjacent to the creek. It is anticipated that such activities would not affect the performance of the mitigation sites. Several options would be implemented to protect mitigation sites from recreational and other urban impacts. These would include the use of signs, fencing, barrier plantings, and/or designated access routes.

Implementing Water Temperature Measures. SRA cover vegetation would be planted to mitigate for shade lost as a result of construction in Segment 1, 2, and 3C Phases 1 and 2. SRA cover vegetation mitigation will be done within Segments 1 and 2, the Reach A mitigation site, and the Guadalupe Creek mitigation site. SRA cover vegetation would grow and begin to provide shade before year 5 and would reach maturity and maximum shade density after year 40. Increasing shade along the river is expected to result in lower water temperatures.

Replacing Spawning Gravel. Effects on spawning gravel from construction in Segments 1, 2 and 3C Phases 1 and 2 will be compensated for by restocking river-run gravel (5,090 sf) in areas shaded by vegetation in Segments 1 and 2. Restocking would take place between June 15 and August 31 to avoid potential adverse effects on adult salmonids that might be present in the river earlier in the year.

Implementing Fish Passage Measures. A low-flow channel would be included in the armored channel bed of Segment 3C Phase 2 to allow fish passage during low flows. A trapezoid/boulder design has been developed with guidance from USFWS, CDFG, and NMFS. In Segments 1 and 2, a weir/pool low-flow channel design developed by CDFG has been installed under I-880 and Coleman Avenue Bridge.

3.3.4 Operation and Maintenance

3.3.4.1 Operation

The Guadalupe River Project would not be fully operational under the No-Action Alternative, because flood protection components would be incomplete. The completed Woz Way to Park Avenue bypass inlet will remain closed. All flood protection features of the Bypass System Alternative, described in Section 3.4.2, "Construction Features," will not be constructed. Under the No-Action Alternative, flooding of downtown San Jose would continue during flood events greater than 7,500 cfs. Flooding is likely every 12 to 23 years.

3.3.4.2 Maintenance

Maintenance needs would also be similar to existing conditions under the No-Action Alternative. The Corps and SCVWD would continue to maintain riparian and SRA vegetation mitigation that has been or would be installed to compensate for impacts resulting from the construction of Segments 1, 2, and 3C Phases 1 and 2.

SCVWD would continue to use its current procedures for maintaining the channel. These procedures generally include removing large woody debris and trash if the debris could block or otherwise impede floodflows. SCVWD would continue to monitor the downtown

segments for potential sediment deposition that could impair fish passage. Sediment removal, if required, would be performed from the top of bank or by using existing access points to avoid impacts on existing bank vegetation. Any sediment removal operations would be in compliance with a streambed alteration agreement with CDFG. Bank stabilization measures would be implemented only when necessary to protect adjacent properties and public facilities.

3.4 Bypass System Alternative

3.4.1 Definition

The Bypass System Alternative is depicted in Figures 3.4-1 and would include the following elements:

- Construction and operation of an underground bypass system to convey floodwaters around important riparian habitat in Segments 3A and 3B
- Additional onsite mitigation plantings in Segments 3A and 3B
- Expanded offsite mitigation in the Reach A mitigation site (Figures 3.4-2 and 3.4-3)
- Expanded offsite mitigation in the Guadalupe Creek mitigation site (Figures 3.4-4 and 3.4-5)
- Decrease in amount of bank and channel bed armoring, new low-flow channel design in the armored channel bed sections of Segments 3A and 3B, addition of invert stabilization structures to arrest erosion of the natural channel bed and improve habitat
- Relocation of pedestrian trails/maintenance roads to accomplish habitat and recreation goals
- Construction of flood training walls in Segment 3C Phase 3
- Operation and maintenance of the entire Guadalupe River Project, including mitigation measures

These modifications to the Authorized Project are required to protect species recently listed under the ESA, to meet conditions for water-quality certification under the CWA, and to further enhance recreational opportunities.

Segment 3A is between Coleman Avenue and New Julian Street. Segment 3B extends from New Julian Street to Park Avenue (Figure 3.4-1). Segment 3C Phase 3 is at the upstream end of the project, near I-880. The Proposed Action Bypass System Alternative would include construction of flood protection in Segments 3A and 3B during 2002 through 2004 and in Segment 3C Phase 3 during 2003 and 2004. Installation of riparian vegetation mitigation plantings began in 1994 and was completed in 1999. Installation of SRA cover vegetation mitigation plantings began in 1999 and would continue through 2004. Installation of anadromous fish habitat mitigation began in 1994 and would continue through 2004 (U.S. Army Corps of Engineers, 1992).

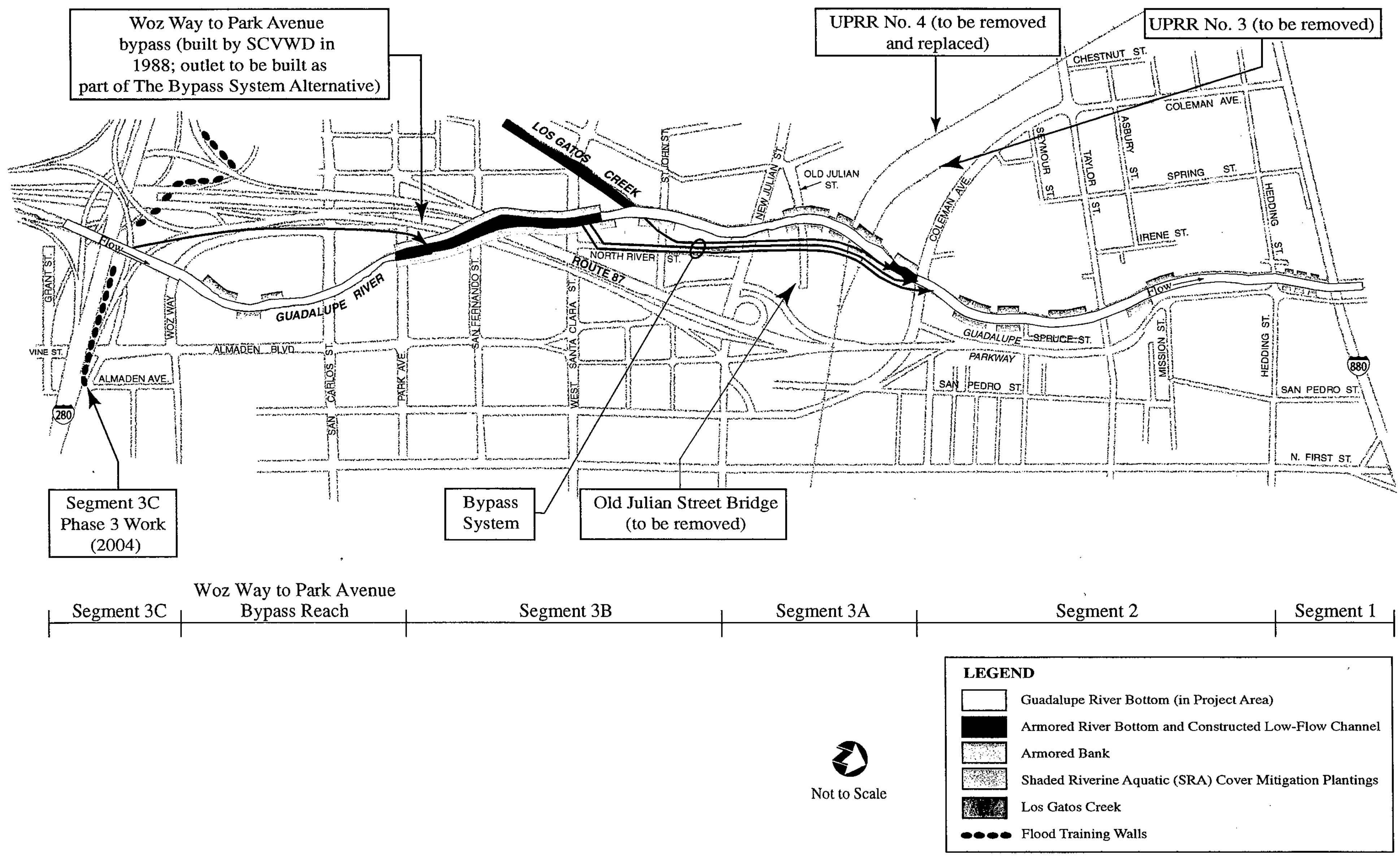


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Figure 3.4-1. Bypass System Alternative Flood Protection and Onsite Mitigation Components

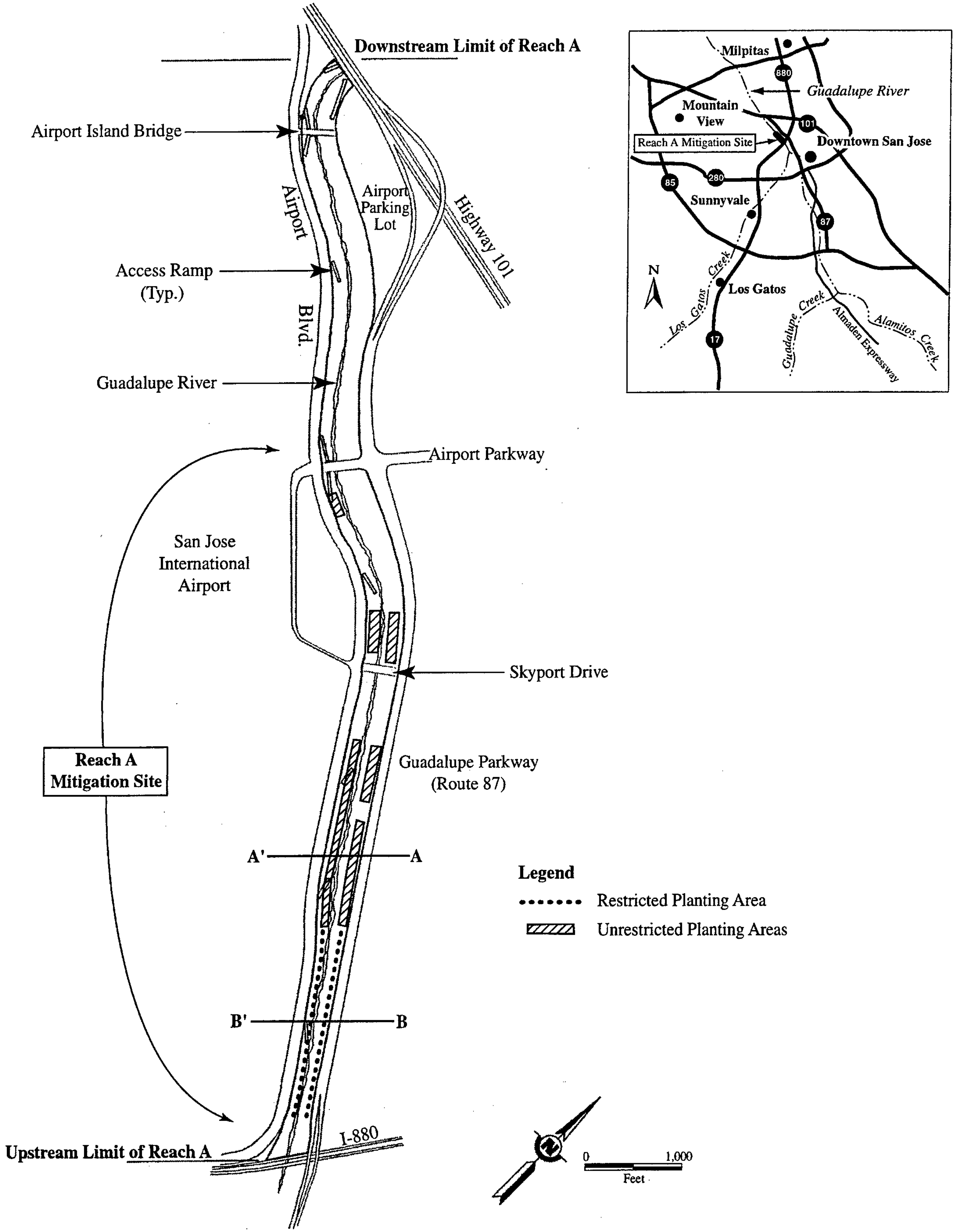
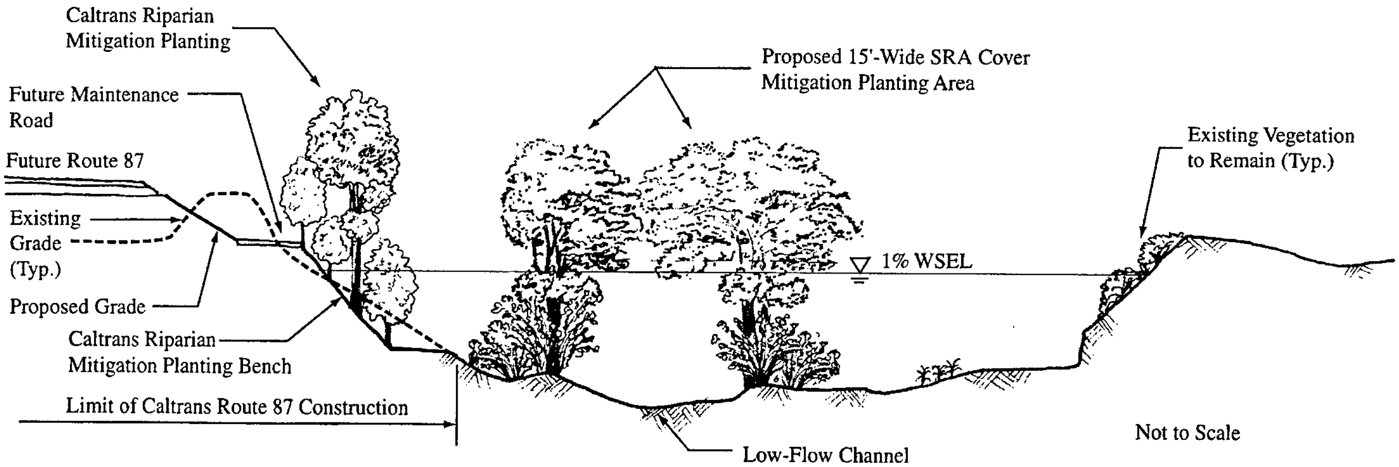
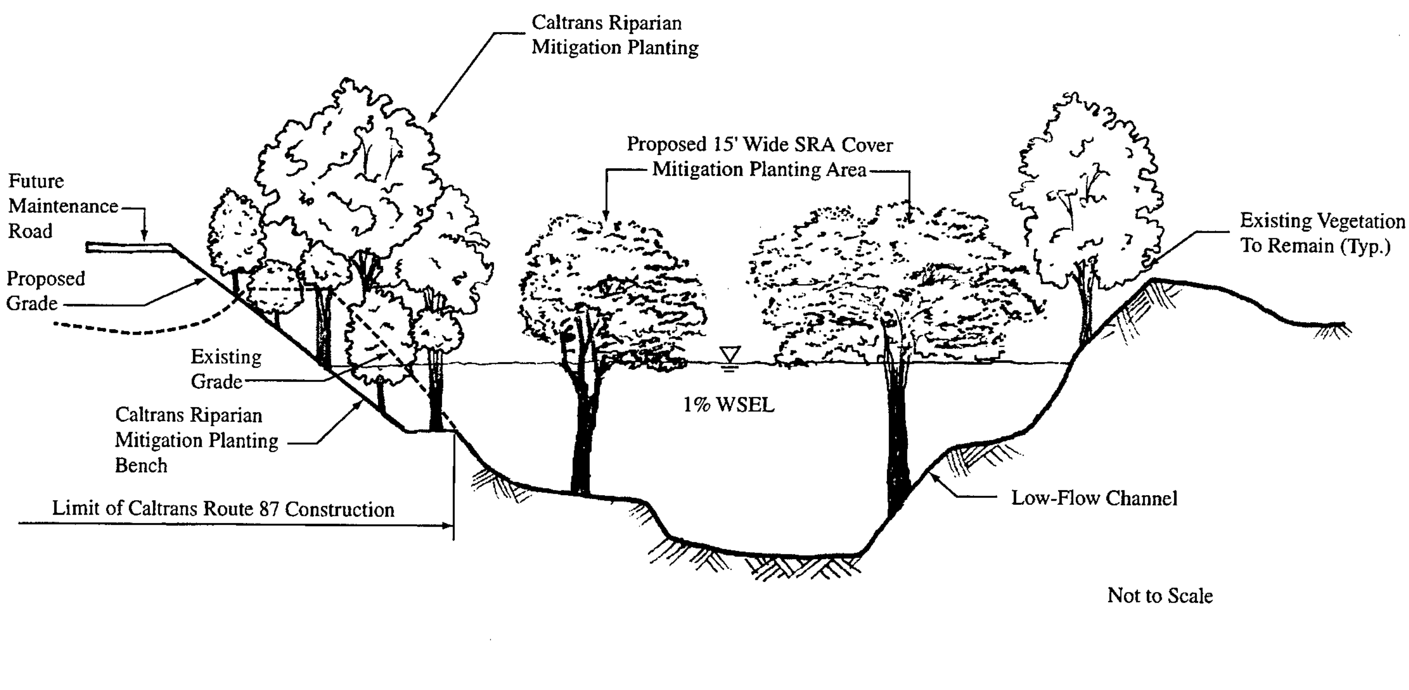


Figure 3.4-2. Reach A Mitigation Site
Planting area locations are approximate.



Typical Planting Areas Between Skyport Drive to 2,000 Feet Downstream of I-880 (A-A')
(Looking Upstream)



Typical Planting Areas Between 2,000 Feet to 300 Feet Downstream of I-880 (B-B')
(Looking Upstream)

Revised

Figure 3.4-3. Conceptual Reach A Cross Sections

(Cross sections are indicated on Figure 3.4-2. Vegetation shown at maturity.)

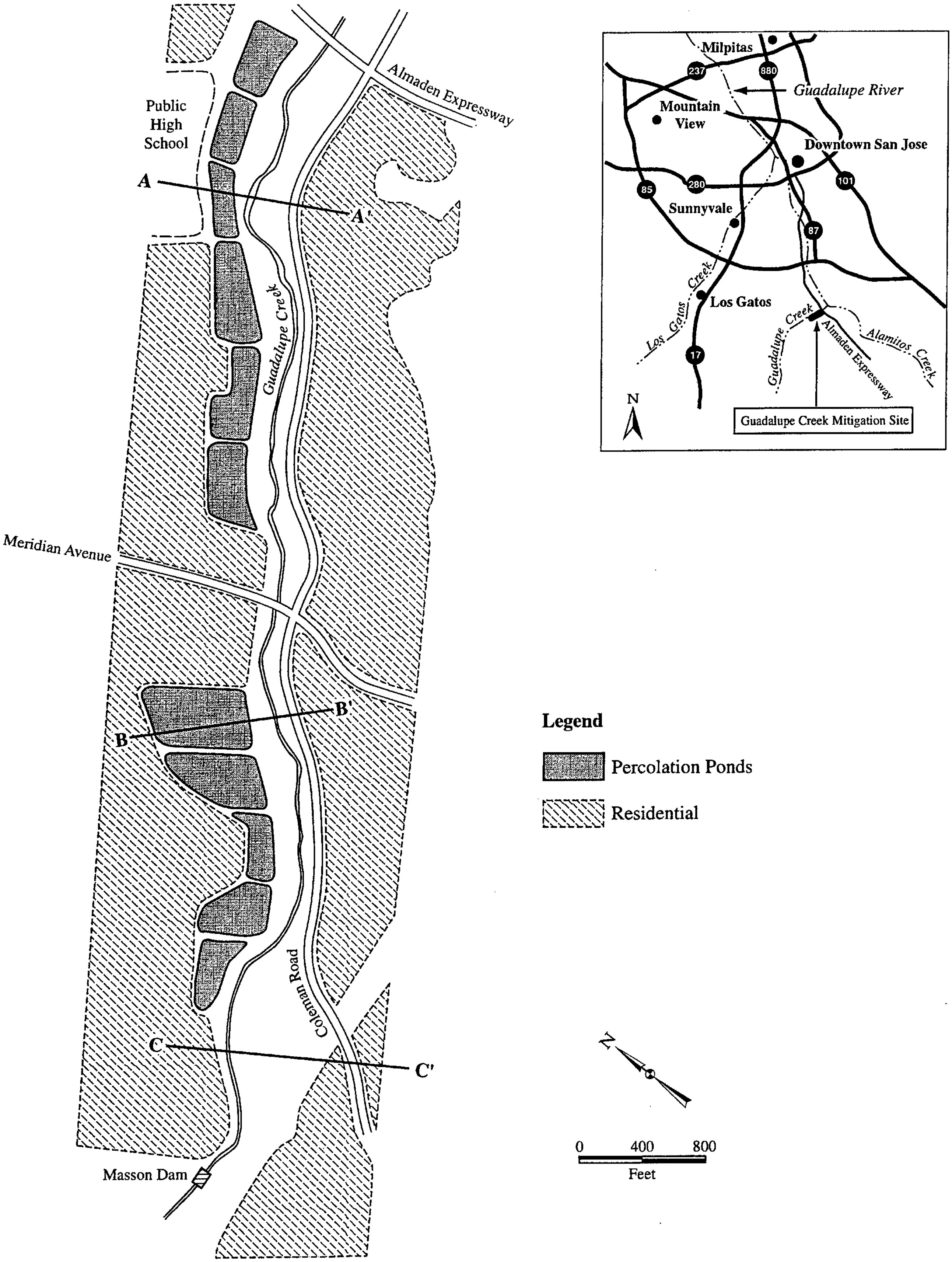
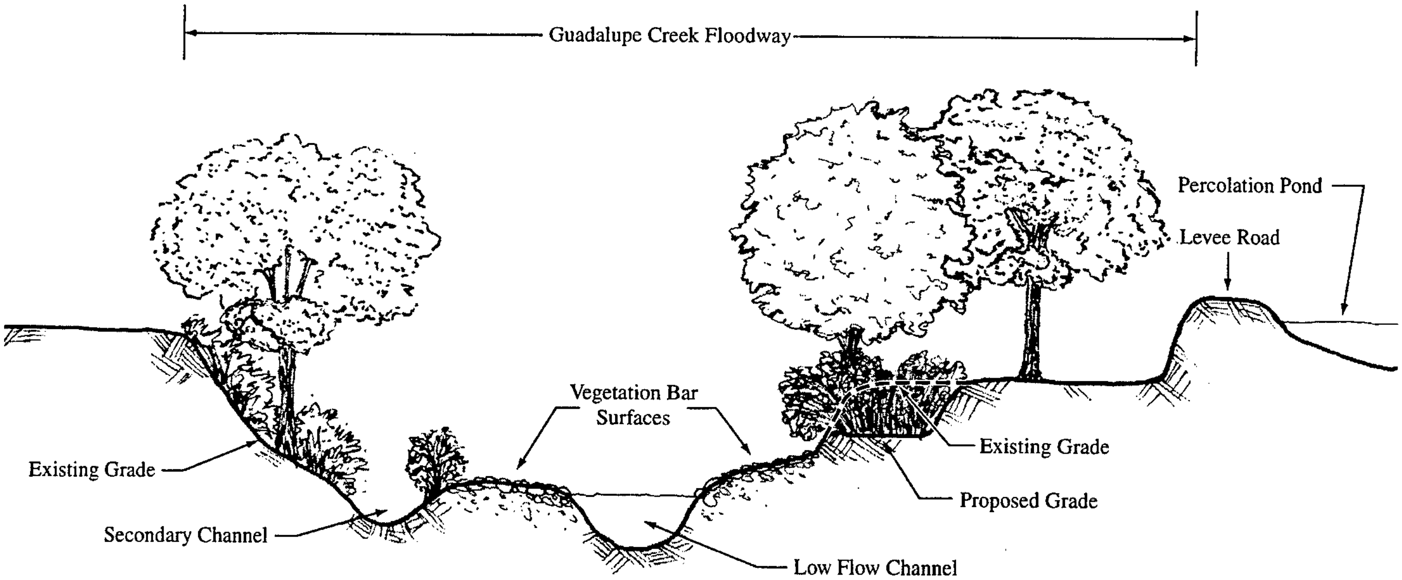
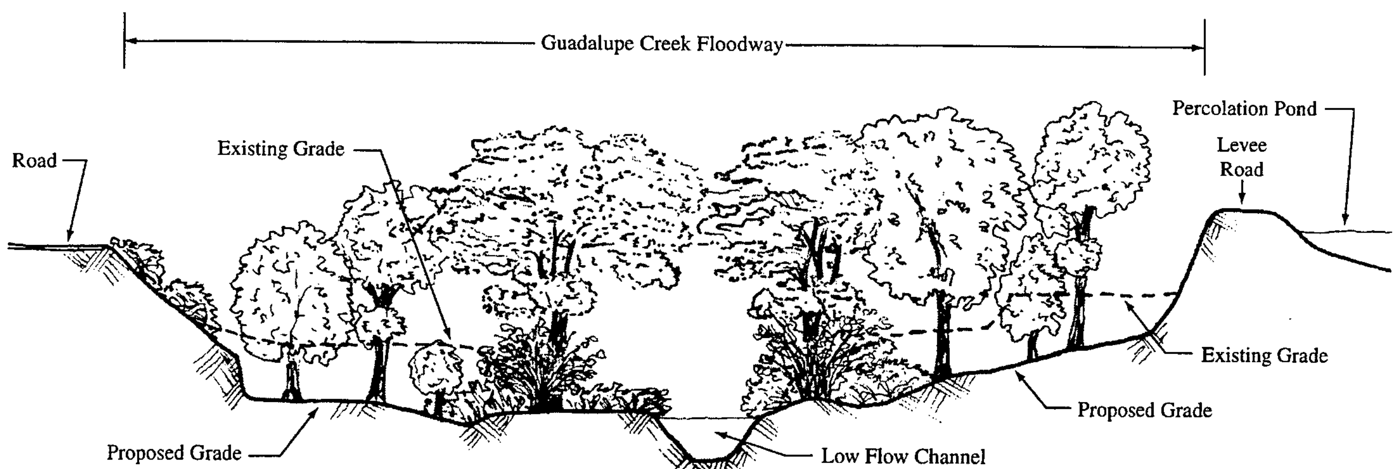


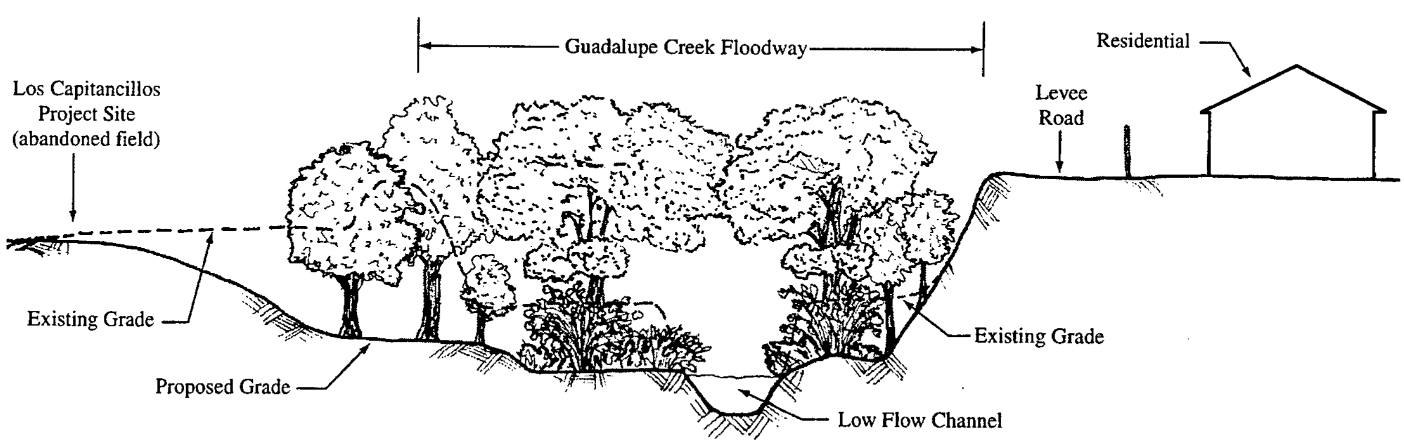
Figure 3.4-4. Guadalupe Creek Mitigation Site



Upstream of Almaden Expressway (A-A')
(Looking Upstream)



Upstream of Meridian Avenue (B-B')
(Looking Upstream)



Upstream of Percolation Ponds (C-C')
(Looking Upstream)

Revised

Not to Scale

Figure 3.4-5. Conceptual Guadalupe Creek Cross Sections
(Cross sections are indicated on Figure 3.4-4)

Originally, the Authorized Project proposed concrete armoring and channel widening, with CCM embankment and trapezoidal riprap channel, for the riverbank and channel bed in Segments 3A and 3B (U.S. Army Corps of Engineers, 1991b). The Bypass System Alternative would use an underground bypass to avoid most of the riparian vegetation and SRA cover vegetation in Segments 3A and 3B, while still meeting the original goal of providing flood protection to downtown San Jose and its vicinity. The proposed bypass system would minimize the need for riverbank and channel bed armoring, although some armoring would still be required to construct the inlets and outlets of the bypass system. As described in Chapter 2, Section 2.3, "Preliminary Alternative Selection and Rationale," a bypass system was selected as the best method for avoiding and minimizing effects on riparian resources and federally listed fish and wildlife species. The bypass system would run underground on the eastern side of the Guadalupe River from the vicinity of West Santa Clara Street to Coleman Avenue, as described in detail below. Figure 3.4-1 shows the areas affected under the Bypass System Alternative. Several resources would be affected, including 5.76 acres of riparian vegetation, 3,861 lf of SRA cover vegetation, and 19,760 sf of spawning gravel.

The Bypass System Alternative is more fully described in Section 3.4.2, "Construction Features." Measures to compensate for adverse environmental effects of the Bypass System Alternative are described in Section 3.4.3, "Environmental Commitments." The environmental commitments would include measures to compensate for effects associated with construction and operation of the Guadalupe River Project with Bypass System Alternative or the Guadalupe River Project with Refined Bypass System Alternative. Section 3.6, "Comparison Summary of Project Features," compares features of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative evaluated in this Report.

3.4.2 Construction Features

Features of the Bypass System Alternative include a bypass system, riverbank armoring, channel bed armoring with a low-flow channel, invert stabilization structures, and flood training walls. In addition, designated bridges would be removed and replaced, a USGS gaging station would be removed and relocated, exposed utility crossings would be relocated, and a nearly continuous public trail/maintenance road system would be constructed between Park Street and Coleman Avenue. These project features are described in detail in the following sections of this Report. Mitigation would be completed before or during construction work.

3.4.2.1 Bypass System

The underground bypass system included in the Bypass System Alternative would consist of three box culverts, "A," "B," and "C," located on the eastern bank of the Guadalupe River. As designed, the box culverts would be of different lengths and have different inlet and outlet locations. The inlet for proposed box culvert A would be located downstream from the West Santa Clara Street Bridge, and the outlet would be located in the vicinity of the Coleman Avenue Bridge (Figure 3.4-1). Box culvert A would be approximately 5,000 feet long and have a cross-section of 18.5 feet by 25.5 feet to 25.5 feet by 25.5 feet. The inlet for proposed box culvert B would be located downstream from the West Santa Clara Street Bridge, and the outlet would be located upstream from the Coleman Avenue Bridge (Figure 3.4-1). Box culvert B would be approximately 4,000 feet long and have a cross-section of 18.5 feet by 25.5 feet to 25.5 feet by 25.5 feet. The inlet for proposed box culvert C would be

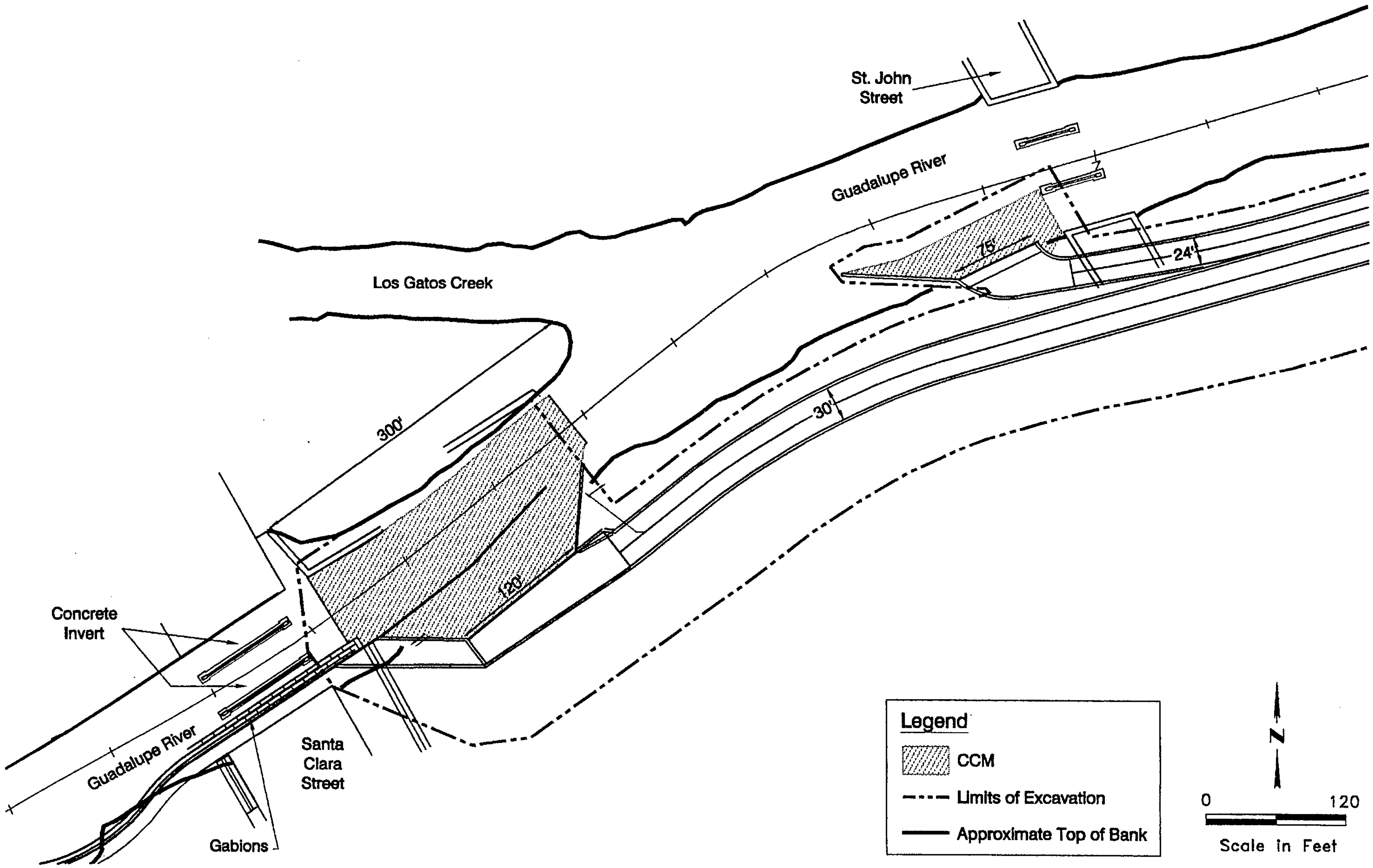
located downstream from the confluence of Los Gatos Creek and the Guadalupe River, and the outlet would be located upstream from the Coleman Avenue Bridge (Figure 3.4-1). Box culvert C would be approximately 2,500 feet long and have a cross-section of 18 feet by 25.5 feet. The estimated amount of material that would be excavated to allow construction of box culverts A, B, and C would be 371,900 cubic yards.

The Bypass System Alternative could include alternative options in which a bypass system consisting of two box culverts would be constructed. Under one option, culverts A and B would be constructed as described above. However, the inlet at Los Gatos Creek would connect with box culvert B. The width of box culvert B would be expanded to accommodate additional floodflows. Outlets would still be in the vicinity of Coleman Avenue. A second option would include construction of box culverts A and C only (Figure 3.4-6a). The inlet to box culvert A would be approximately 120 feet wide and the inlet to box culvert C would be approximately 75 feet wide. Box culvert A would have a cross-section of approximately 30 feet by 30 feet and box culvert C would have a cross-section of approximately 24 feet by 24 feet.

Under either scenario, the proposed bypass would be constructed below portions of North River Street, St. John Street, and New Julian Street. Construction would require the temporary closure of one or more traffic lanes. The bypass would also cross under UPRR tracks. As water rises during flood events in the Guadalupe River, flows would continue in the main river channel, but would also begin to flow over a weir and into the box culverts ata minimum of 1,500 cfs. The total diversion from the main river channel during a 100-year flood event will be approximately 7,000 cfs at the bypass system entrance near West Santa Clara Street and 3,000 cfs at the bypass system entrance near St. John Street. Approximately 7,000 cfs will remain in the natural channel. There will be approximately 2 feet of freeboard in the box culverts during the peak storm event. One storm every 2 years may generate enough flow for river water to spill into the bypass. The bottom of the box culverts would be sloped to drain. As sediment and flood debris could settle on the bottom of the box culverts after large storm events, periodic maintenance of the box culverts would be required. The weir heights may be modified with the objective of preventing sediment inflow and maximizing floodflows into the culverts while providing 2 feet of freeboard. The minimum threshold for flows into the box culverts would still be 1,500 cfs. Public access to the interior of the bypass would be prohibited at all times; signs warning the public that trespassing is prohibited would be posted near the openings of the bypass system. No physical devices, such as screens, are planned to be installed at this time to prevent access. The Corps and SCVWD would continue to work with the City of San Jose to ensure that safety concerns are minimized to the maximum extent practicable.

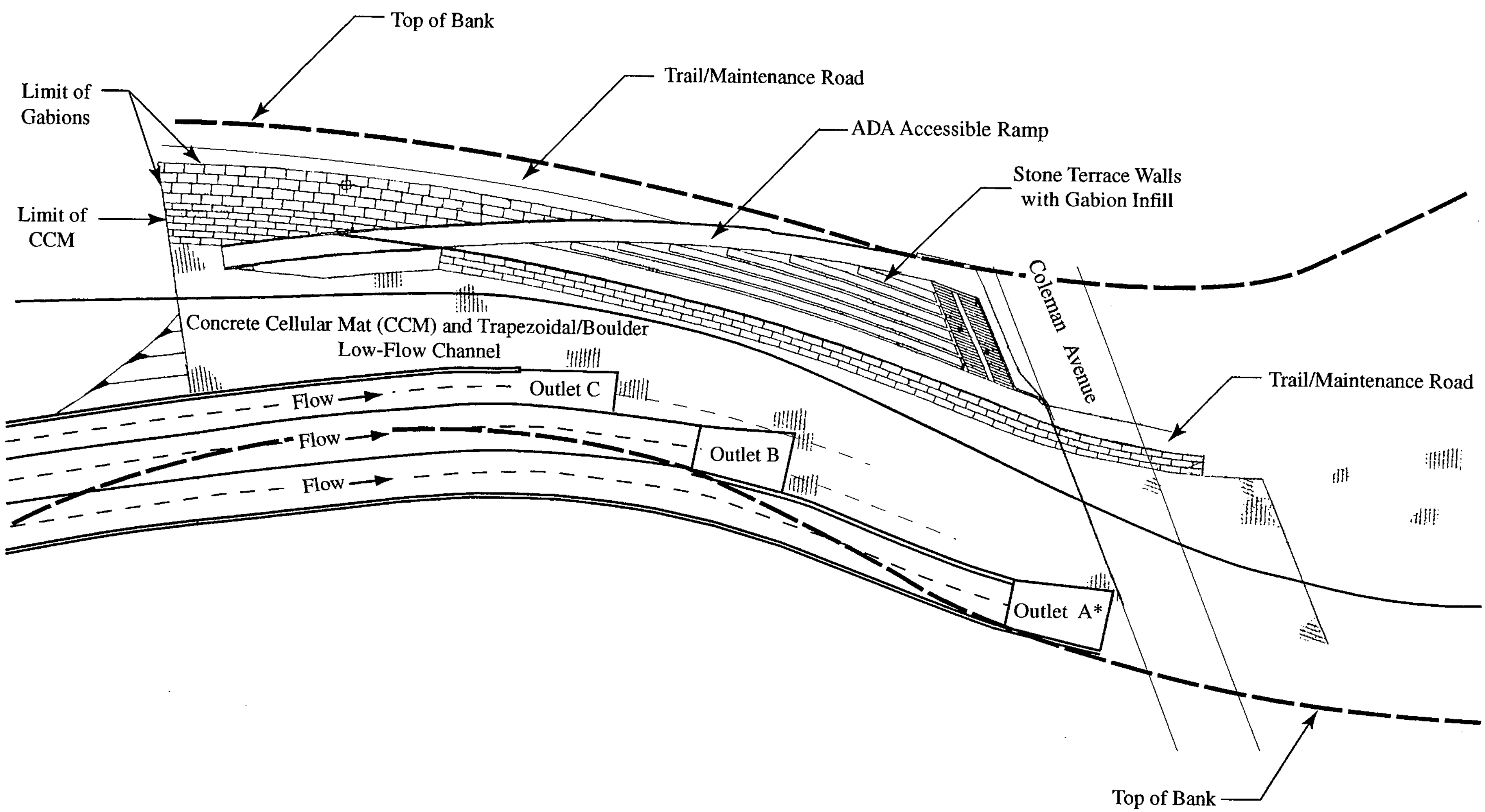
3.4.2.2 Riverbank and Channel Bed Armoring

In Segment 3A, approximately 695 feet of west riverbank and channel bed armoring and 695 feet of east riverbank armoring would be constructed below and upstream from the Coleman Avenue Bridge at the downstream end of the Bypass System Alternative (Figure 3.4-1, Figure 3.4-6b). On the western bank, gabions would armor the toe of the slope, and stone terraces would armor the riverbank. A wheelchair-accessible ramp would be installed in the bank armoring to allow trail passage under the Coleman Avenue Bridge. On the eastern bank, gabions would armor the toe of the slope, and a vertical concrete retaining wall would armor the riverbank. To prevent erosion, the channel bed would be armored with CCM below and upstream from the Coleman Avenue Bridge.



New Source: US Army Corps of Engineers, 2000

Figure 3.4-6a. Proposed Bypass System Inlet Configuration



*Outlet A will be located in the vicinity of Coleman Avenue.

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Figure 3.4-6b. Proposed Riverbank and Channel Bed Armoring in Segment 3A Upstream from Coleman Avenue

In addition, approximately 50 lf of the eastern bank downstream from the New Julian Street Bridge would be armored with gabions to provide for a pedestrian undercrossing of the bridge (Figure 3.4-1). Armoring in the vicinity of the New Julian Street Bridge would be required for maintenance access or to allow the trail to pass under the bridge on the eastern bank.

In Segment 3B, approximately 1,861 lf of riverbank armoring on the west bank, 2,231 lf of riverbank armoring on the east bank, and 1,861 lf of channel bed armoring would be installed from 340 feet downstream from the West Santa Clara Street Bridge to under the Park Avenue Bridge (Figure 3.4-1). On the eastern bank, armoring would include gabions at the toe of the slope and stone terraces on the slope. On the western bank, armoring would include a vertical concrete retaining wall 18 to 22 feet high beginning at the Woz Way Bypass and ending at West Santa Clara Street. Two other areas on the eastern bank in Segment 3B would also be armored: 150 feet under and upstream from New Julian Street Bridge and 180 feet under and upstream from the St. John Street Bridge. The St. John Street Bridge would be armored with CCM (Figure 3.4-1), surrounding the inlet to the bypass. Most of the channel bed in Segment 3B would be armored with CCM, and this armored channel bed would contain a low-flow channel for fish passage. At West Santa Clara Street, Park Avenue, and New Julian Street, stairs or ramps would be integrated into the stone terraces to provide access under the bridges.

As the weir heights are adjusted to prevent sediment from getting into the new bypass system, channel widening could be required on the west bank downstream from West Santa Clara Street. The top of the west bank would remain undisturbed, the existing retaining wall would be extended between 20–50 feet to the north, and the bank would be steepened to approximately 1 Vertical on 1 Horizontal–1 Vertical on 2 Horizontal beginning at the toe of the extended wall. This widening would occur within the proposed armoring zone limit of 340 feet downstream from West Santa Clara Street as described above.

Because of channel excavation and grading, a new, larger sewerline would be constructed under the river downstream from West Santa Clara Street to ensure adequate capacity in the sewerline serving the new existing ranger station. The outlet structure for the existing Woz Way to Park Avenue bypass would also be constructed at this time as part of Segment 3B. This outlet structure would be located on the west bank, directly downstream (north) from the Park Avenue Bridge.

3.4.2.3 Low-Flow Channel

The 2,556 lf of the channel bed proposed for armoring with CCM in Segments 3A and 3B would contain a low-flow channel for fish passage (Figure 3.4-7).

Within the armored channel bed in Segments 3A and 3B, a low-flow channel with check structures would be constructed. The low-flow channel check-structure design will be constructed using concrete sills, boulders, and gravel. This design will maintain a minimum average water depth of 1.2 feet when the flow is 0-1 cfs. The low-flow channel with check structures has been designed to provide pools at low flows, thereby maintaining cooler water temperatures and improving anadromous fish habitat. At 4 cfs, the minimum average water depth will be greater than 1.2 feet. The depth meets Thompson's (1972) minimum water depth criteria of 0.6 foot (7.2 inches) for steelhead and 0.8 foot (9.6 inches) for chinook salmon. The sills would be placed at a spacing of 200 to 300 feet within the low-flow channel

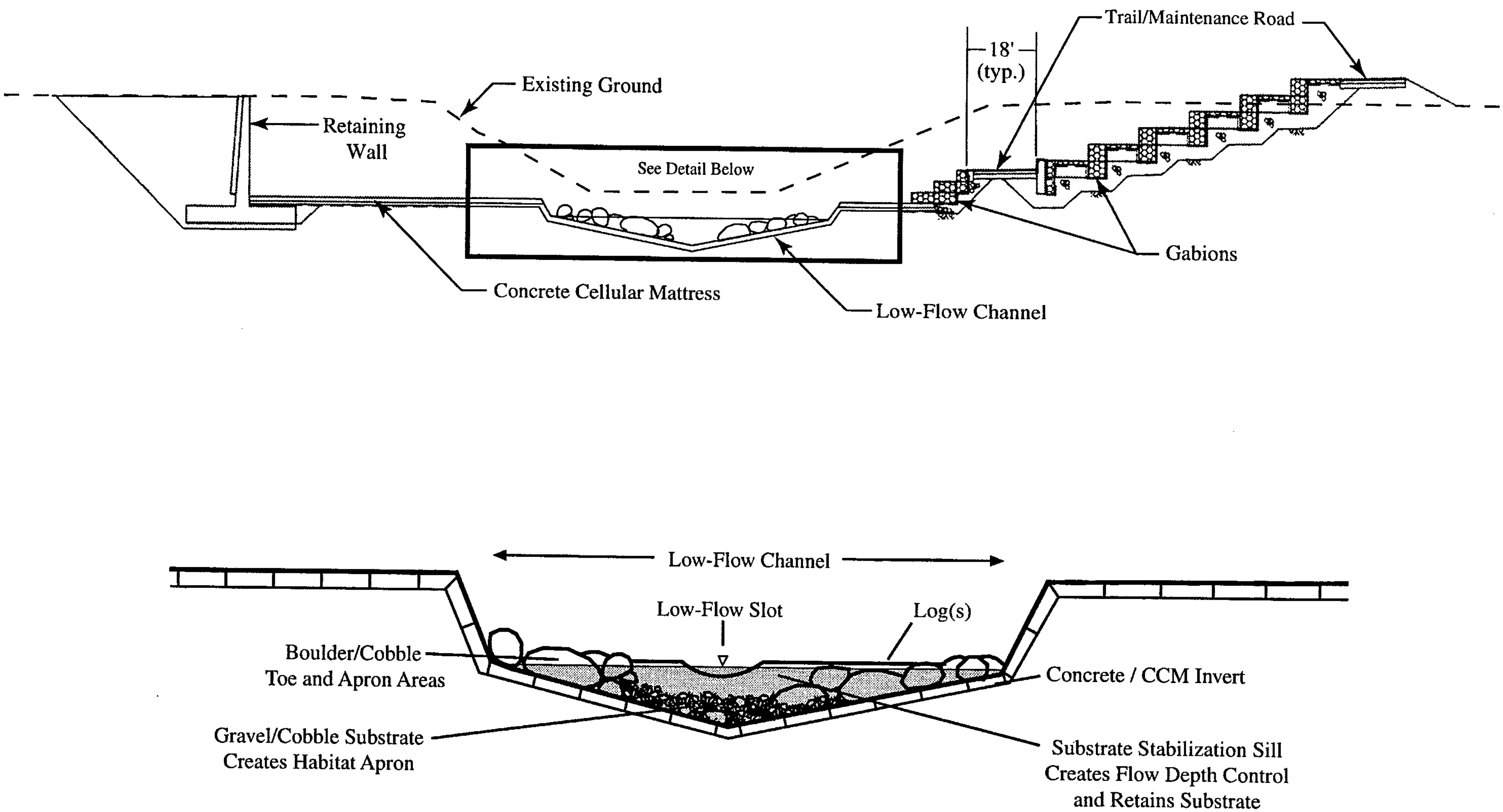

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Figure 3.4-7. General Cross Section of the Proposed Riverbank and Channel Bed Armoring in Segment 3B between Santa Clara Street and San Fernando Street and the Preliminary Low-Flow Channel with Check Structure Design

of the armored channel bed (Figure 3.4-7). Depending on the final design and spacing adopted, between five and seven low-flow channel check-structures would be constructed. The configuration, spacing, and number of low-flow channel check-structures might be adjusted after placement and after significant flood events to provide the desired water-surface level control at zero and low flows.

The proposed sill would be constructed of concrete. Boulders would be placed using four-wheel drive front-end loaders after construction of the armored channel bed. Final placement, arrangement, and spacing of the boulders would depend on the size and shape of the individual boulders and be designed to ensure maintenance of the desired water depth.

Maintenance of the low-flow channel would be performed with four-wheel drive front-end loaders and would include the reconfiguration of boulders and removal of fine sediment to ensure the continued operational effectiveness of the low-flow channel check-structures. Maintenance access would be from the trail/maintenance road. Maintenance of, and sediment removal from, the low-flow channel might be required after 10-year flood events.

3.4.2.4 Invert Stabilization Structures

Invert stabilization structures are small weirs that would be placed in the natural river channel in Segments 3A and 3B to reduce the grade of the river, trap coarse sediment, and create in-channel bars and instream fish habitat. Between 9 and 15 invert stabilization structures (Figure 3.4-8) would be placed in the channel bed in unarmored sections of Segments 3A and 3B between Santa Clara Street and Coleman Avenue. Between 9 and 20 invert stabilization structures would be placed in the channel bed in Segments 1 and 2 between Coleman Avenue and I-880, if needed. The footings of the invert stabilization structures would be constructed of concrete (Figure 3.4-8). Logs would be fastened to the top of the footings to create drops in grade between structures of 1 foot or less. The logs could be adjusted as necessary to change the depth of water behind them. The low-flow slots in the invert stabilization structures would be approximately 3.5 to 4 feet wide to allow the passage of small watercraft. The sides of low-flow slots would slope gradually up to the top of the structure; this slope would help to concentrate the lower flows into a deeper, narrower channel, and encourage the development of plunge pools below the low-flow slots of the structure. A plunge pool is a pool formed as a result of water flowing through the low-flow slot in the invert stabilization structure and scouring out a pool just below the structure. The pools are expected to be from 1 to 3 feet deep. The concentration of low flows into the natural low flow channel and the creation of plunge pools would benefit anadromous fish passage and provide instream fish habitat.

The invert stabilization structures would be built using a four-wheel drive front-end loader and backhoes. Water would be diverted from the construction area, a trench approximately 3 to 4 feet deep by 2 feet wide would be excavated in the channel bed, and formwork for the 1-foot-wide concrete footings would then be built (Figure 3.4-8). Steel reinforcing would be placed within the formwork, and concrete would be pumped through an overhead delivery system to avoid impacts on riparian vegetation. Concrete would be pumped from trucks at road crossings or unvegetated areas at the top of the bank. The footings would extend into the channel bank approximately 3 feet and would be built to an elevation approximately 2 to 3 feet above the summer water level. After the concrete has cured, the formwork would be removed and suitable channel bed material would be used to backfill the trench.

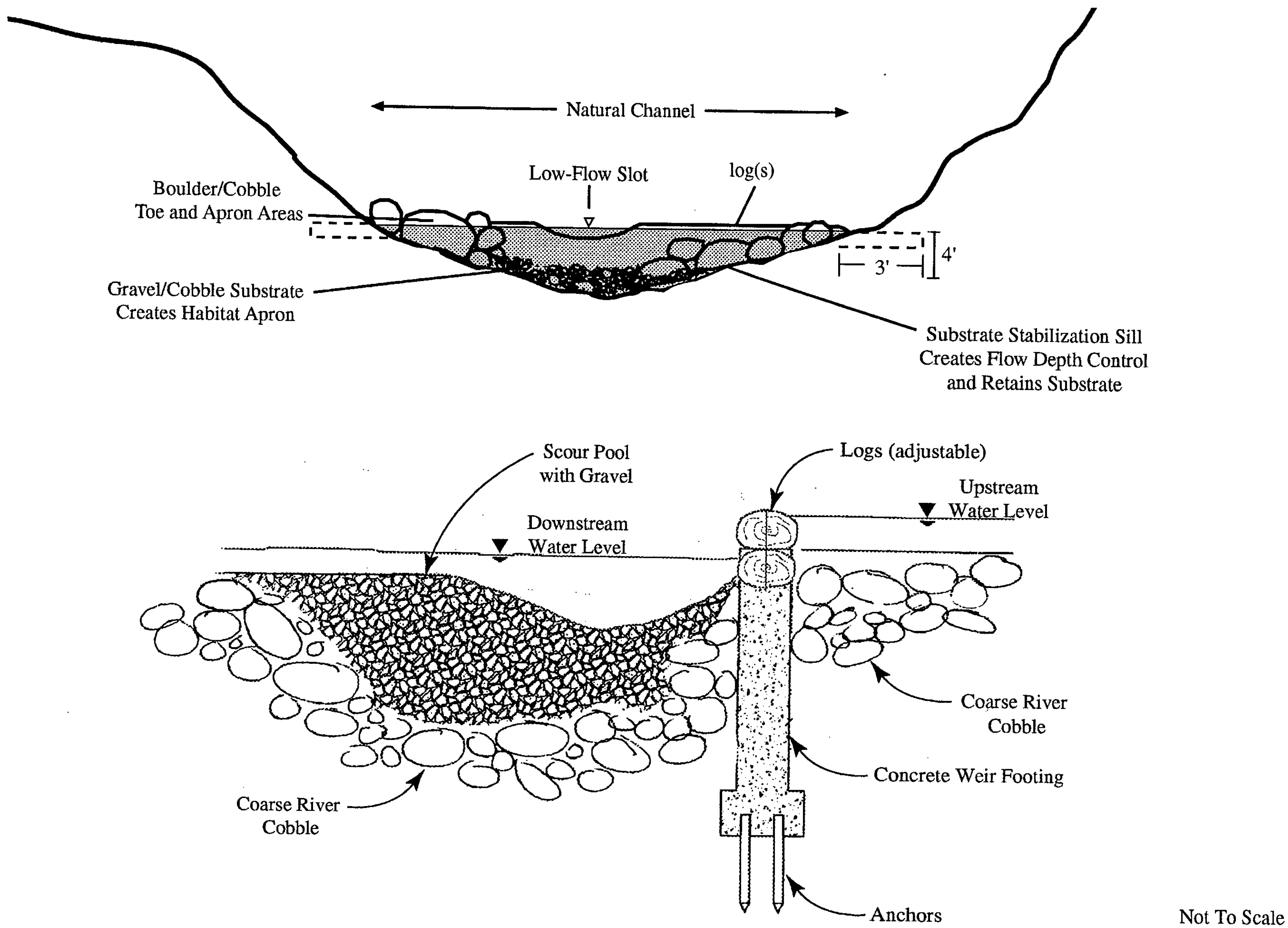

Figure 3.4-8. General Cross Section of the Natural Channel in Segments 3A and 3B and the Preliminary Invert Stabilization Structure Design

3.4.2.5 Flood Training Walls

Flood training walls would be constructed in Segment 3C Phase 3 to direct overbank floodflows occurring upstream from Segment 3C into the river channel (U.S. Army Corps of Engineers, 1991b). The flood training walls would be located on the eastern and western sides of the river. The walls would be constructed of concrete or of concrete masonry units (CMUs). On the eastern bank, 600 lf of wall would extend from the I-280 bridge abutment to the intersection of Almaden Boulevard and Vine Street, 60 lf of wall would extend across the median, and 200 lf of wall would extend from the intersection of Almaden Boulevard and Vine Street to Almaden Avenue (Figure 3.4-1). The eastern bank wall would range in height from 0.5 foot to 3.5 feet.

On the western bank, 120 lf of flood training wall would extend from the river to the edge of the Children's Discovery Museum parking lot, 440 lf of earthen berm would extend across the southern edge of the Children's Discovery Museum parking lot, 33 lf of wall would tie into the light rail bridge abutment, 180 lf of earthen berm would extend under the State Route 87 South/I-280 South connector, and 820 lf of wall would extend along the western side of the State Route 87 South/I-280 North connector. The berm would range in height from 0.5 foot to 3.5 feet. The western bank wall would range in height from 0.5 foot to 4.5 feet. As discussed above, construction of Segment 3C Phase 3 is scheduled for 2003 and 2004; however, the flood training walls would not be completed and made functional until the Lower Guadalupe River Project is completed (Section 1.6.8, "Lower Guadalupe River Flood Protection Project").

During a flood, the street crossings at the intersection of Almaden Boulevard and Vine Street and at Almaden Avenue would be closed for approximately 24 to 48 hours to redirect water back into the river channel. A final design for street crossing closures has not been determined, but a stop-log structure, sandbags, and inflatable dams are under consideration. The flood training walls will not induce flooding, as described in Section 5.1.3, "Bypass System Alternative." The final temporary closure design will be incorporated into the Final Operation and Maintenance Manual. When the Upper Guadalupe River Project is completed by SCVWD, street closure operations for the training walls would no longer be needed because the Upper Guadalupe River Project would prevent the overbank flows that the training walls are designed to collect.

3.4.2.6 Bridge Removal and Replacement

UPRR No. 3 and No. 4 bridges would be removed, and it is assumed that UPRR No. 4 Bridge would be replaced. Exposed gas and sewer lines cross the river 150 feet upstream from UPRR No. 4 Bridge; they are encased in a concrete enclosure 4.5 feet wide by 3 feet high. Because this enclosure might act as a barrier to fish at low flows, it would be relocated under the riverbed using a sewer siphon system. The Old Julian Street Bridge will also be removed. Because there is an exposed sewerline under the Old Julian Street Bridge, a new sewerline would be built under the river on the downstream side of the Old Julian Street Bridge using a sewer siphon system or constructed as part of the bridge. Bridge removal would cause temporary disturbance of the western and eastern bank vegetation and the river substrate. Effects of bridge removal and replacement are included as part of the Bypass System Alternative.

3.4.2.7 USGS Gaging Station Replacement

An existing USGS gaging weir upstream from the St. John Street Bridge in Segment 3B blocks fish passage and would be demolished and replaced with an invert stabilization structure. A new USGS gaging house to measure flow would be installed at a location to be determined after consultation with the USGS. The future gaging house would be placed in a location outside the SRA cover vegetation zone, and the gage would be in an armored portion of the river that will allow for fish and boat passage.

3.4.2.8 Recreation Trails

Additional public recreation along the river corridor will be provided by constructing substantial portions of a nearly continuous trail system (Figure 3.4-9). Under the Bypass System Alternative, new facilities will be constructed between Park Avenue and Coleman Avenue. The riverwalk system would accommodate the estimated 1.3 million annual visitors to the project area and provide access for flood protection maintenance. Pedestrian trails that could accommodate maintenance vehicles would be 12 feet wide and include an asphalt surface. Combined trail/maintenance roads would be 18 feet wide and include a 12-foot-wide asphalt surface bordered on each side with a 3-foot-wide strip of reinforced turf. Eastern and western bank facilities are described below.

On the eastern bank downstream from Park Avenue, there will be two trails, including 18-foot-wide river and top-of-bank trails. The river trail would be built into the armored portion of the river 6 feet above the summer water level and would connect with the existing Woz Way to Park Avenue trail that passes under, and terminates at the downstream side of, Park Avenue. The top-of-bank trail begins at the downstream sidewalk of Park Avenue. There will be ramp sloped down the bank from the upper trail to the lower trail between Park Avenue and San Fernando Street across from the Woz Way to Park Avenue bypass outlet. There will be a ramp sloped up the bank that would merge the river trail with the top-of-bank trail after West Santa Clara Street. The top-of-bank trail will have stairs down to the river trail at the following locations: downstream from Park Avenue, downstream from San Fernando Street, and upstream and downstream from West Santa Clara Street. The top- of-bank trail will have at-grade road-level access, and it will connect with existing sidewalks when it intersects Park Avenue, San Fernando Street, and West Santa Clara Street.

As the eastern top-of-bank trail continues downstream from West Santa Clara Street, there will be an at-grade access along River Street between West Santa Clara Street and St. John Street. There will also be at-grade access at St. John Street and New Julian Street. The trail will connect with the St. John Street Bridge. For trail users who do not wish to cross at-grade at New Julian Street, there will be stairs upstream and downstream, and a short river trail under the bridge. The top-of-bank trail will continue downstream from New Julian Street crossing the reconstructed UPRR No. 4 track either via a bridge or as an underground crossing. The final railroad crossing method would be determined in coordination with UPRR. The trial will continue to above Coleman Avenue, where the trail will descend the armored bank to pass under the Coleman Avenue Bridge and connect with the eastern bank trail in Segment 2.

On the western bank, the existing Woz Way to Park Avenue trail will be extended under Park Avenue and terminate in a switch-back ramp that traverses the armored bank of the

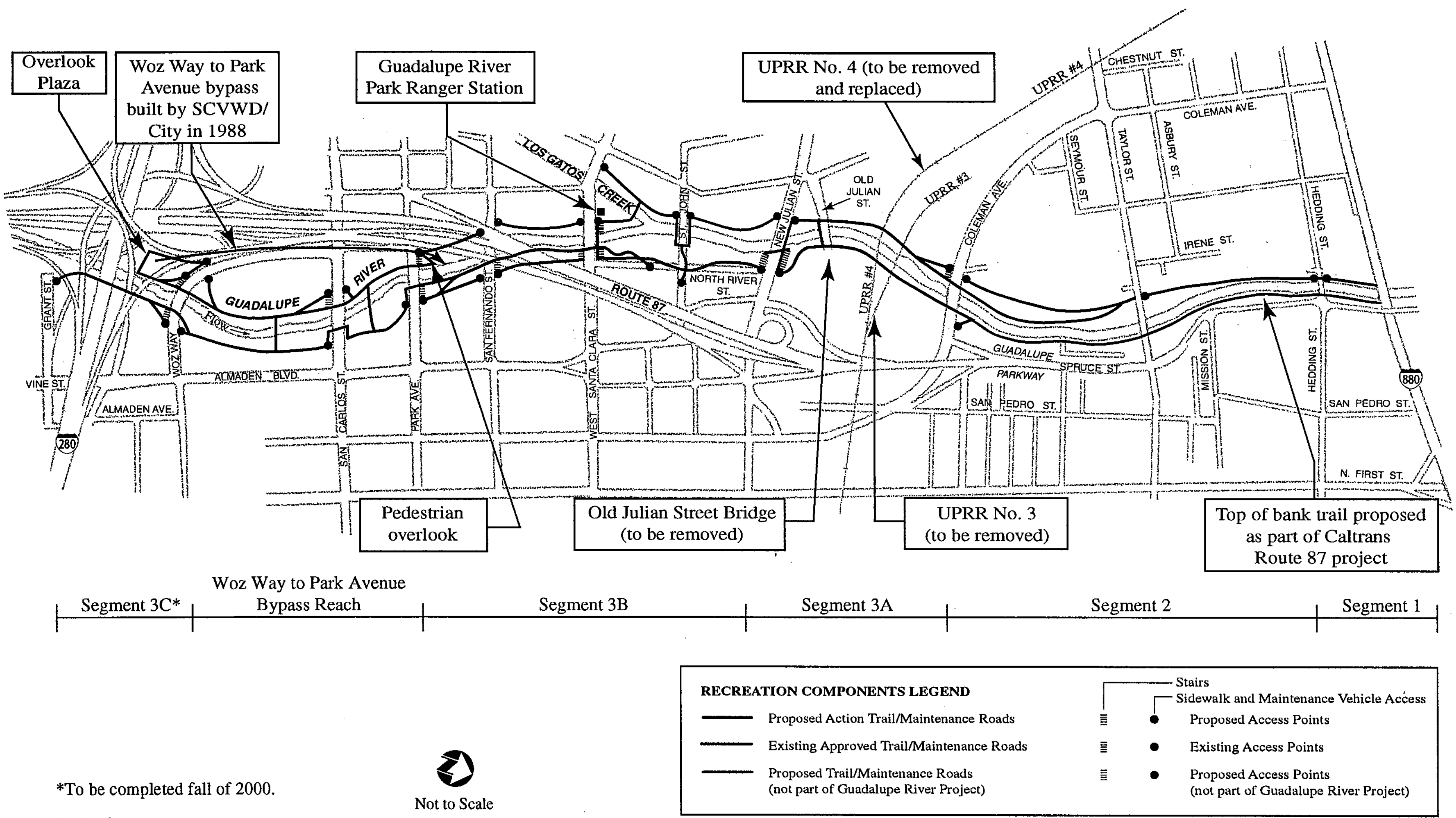

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Figure 3.4-9. Existing and Proposed Recreation Components under the Bypass System Alternative

proposed pedestrian overlook at the Woz Way to Park Avenue bypass outlet. Stairs would also be provided downstream from Park Avenue to connect the river trail with a top-of-bank trail. A 12-foot-wide top-of-bank trail will continue downstream from Park Avenue to San Fernando Street, where it will connect at-grade.

No trails are currently proposed for the western bank between San Fernando Street and West Santa Clara Street or from St. John Street to New Julian Street, although proposed nonproject trails shown in Figure 3.4-9 will provide connection. Until the nonproject trails are complete, trail users will have to cross from the western bank to the eastern bank using sidewalks on the San Fernando Street, West Santa Clara Street, St. John Street, and New Julian Street Bridges. The partially completed stairs downstream from West Santa Clara Street will be finished.

Downstream from New Julian Street to Coleman Avenue, there will be an 18-foot-wide top-of-bank trail. The top-of-bank trail would begin at-grade and cross the reconstructed UPRR No. 4 railroad either via a bridge over the tracks or as an underground crossing. The final railroad crossing method would be determined in coordination with UPRR. Before Coleman Avenue, there will be a 300-foot-long wheelchair-accessible ramp sloped down the bank to pass under the Coleman Avenue Bridge and connect with the river trail in Segment 2. Upstream from Coleman Avenue, the top-of-bank trail will terminate at grade with the sidewalk, and there will be stairs from the top-of-bank trail to the river trail.

3.4.2.9 Onsite and Offsite Mitigation Areas

To mitigate for project effects, SRA cover vegetation will be planted at both onsite and offsite mitigation areas. Onsite areas include Segments 1, 2, 3A, and 3B (Figure 3.4-1). Offsite areas include Reach A and Guadalupe Creek (Figures 3.4-2 and 3.4-4).

Site Selection Criteria. The HEP technical team selected the above mitigation areas based on direction from resource agencies (Section 1.6.11, "Guadalupe River Project Biological Assessments"). After onsite mitigation was maximized, offsite mitigation areas were considered using additional selection criteria. Reach A was identified because of its close proximity to Segments 1, 2 and 3, and because of its suitability for use by chinook salmon once SRA cover mitigation is installed. Guadalupe Creek was identified because it provided the opportunity to expand the range for rearing and spawning habitat for steelhead in the upper tributaries of the Guadalupe River watershed. Fish passage improvements undertaken by SCVWD as part of other projects will allow steelhead to access Guadalupe Creek. Additionally, SCVWD has agreed to discontinue instream percolation activities in the Guadalupe Creek mitigation area.

Onsite Mitigation. Onsite SRA cover vegetation mitigation includes planting 575 lf of riparian vegetation in Segment 1, 1,081 lf in Segment 2, 878 lf in Segment 3A, and 410 lf in the Woz Way to Park Avenue bypass reach (Figure 3.4-1).

Onsite SRA cover vegetation mitigation sites will include planting areas disturbed during construction and existing gaps in the SRA cover vegetation canopy. In one area in Segment 1 existing bank riprap will be removed to create additional space for plantings. Plants will be installed in a random pattern approximately 5 to 6 feet on center and within 15 feet of the water's edge. Species being planted as part of the SRA cover vegetation mitigation would be native to the Guadalupe River watershed and of local genetic origin. Target planting densities are estimated to be approximately 50 plants per 100 lf. The plant material may

include container plants and/or cuttings that will be installed in augured or hand-excavated holes. Biotechnical features may be required to ensure riverbank stability and planting success. Biotechnical features could include rootwads, boulders, and logs. Biotechnical features and SRA cover vegetation, which results in leaf litter and branches falling into the river, provide instream cover.

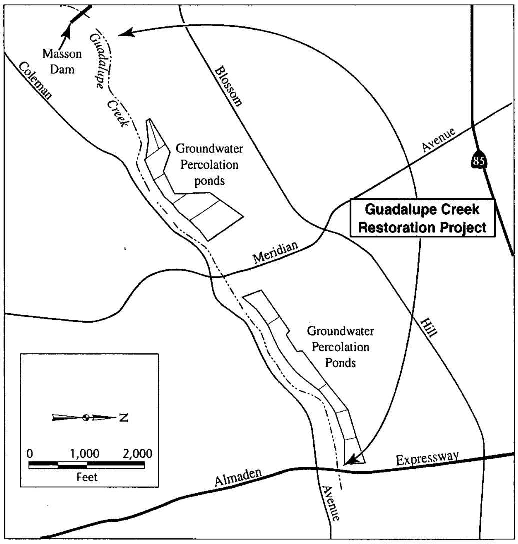
Reach A Mitigation Site. The Reach A mitigation site is located immediately downstream from the Guadalupe River Project area, between I-880 and Airport Parkway (Figure 3.4-2). The mitigation site is bordered on the east by the Guadalupe Parkway and on the west by San Jose International Airport. A total of approximately 7,848 lf of 15-foot-wide planting areas—approximately 2.7 acres—of riparian SRA cover vegetation would be planted along the Guadalupe River in Reach A to provide SRA cover vegetation along this reach of the river; 1,543 lf has been planted to date. The mitigation in Reach A would be done in three distinct areas: the no-planting area, the restricted planting area, and the unrestricted planting area. These areas were selected based on hydraulic modeling.

Based on the results of hydraulic modeling, no mitigation plantings would be installed within 300 feet downstream from I-880 to maintain hydraulic capacity. The restricted planting area begins 300 feet downstream from I-880 and extends approximately 1,673 feet on both sides of the river; a total of approximately 3,346 lf of SRA cover vegetation mitigation would be planted in the restricted planting area, of which 600 lf has already been planted. The restricted planting area would provide a single row of vegetation along both sides of the river.

Future mitigation in the restricted planting area would include planting riparian vegetation on different types of soil and using different degrees and types of slope surfaces along approximately 2,746 lf of Reach A. Because of hydraulic constraints, planting would be limited to one plant every 5 to 6 feet along the bank. Plants would be distributed in a fragmented, nonlinear row within the 15-foot-wide planting zone. The plant material would be installed in augured or hand-excavated holes and might include container plants and/or cuttings. Species planted in the restricted planting areas would be limited to those that would have a single trunk at maturity. Examples of single-trunk trees include Fremont's cottonwood, western sycamore, white alder, red willow, and yellow willow. Shrub or shrub-like species such as arroyo willow, sandbar willow, box elder, and mule fat would not be planted.

The unrestricted planting areas begin approximately 2,000 feet downstream from I-880; planting would be done in areas adjacent to Airport Parkway. A total of approximately 4,502 lf of SRA cover vegetation mitigation would be planted in the unrestricted areas, of which 943 lf has already been planted. Future mitigation in the unrestricted planting areas would include planting riparian vegetation on different types of soil and using different degrees and types of slope surfaces along approximately 3,559 lf of Reach A. Plants would be installed in a random pattern approximately 5 to 6 feet on center, with a planting density of approximately 50 plants per 100 lf. Plant materials would be installed in augured or hand-excavated holes and might include container plants and/or cuttings. Planting in the unrestricted planting areas would include both tree and shrub species. Biotechnical features may be required to ensure riverbank stability and planting success. Biotechnical features could include rootwads, boulders, and logs.

Guadalupe Creek Mitigation Site*



*This figure depicts the entire Guadalupe Creek Restoration Project area. A portion of this area will be used to mitigate for the Guadalupe River Project with Proposed Action.

Reach A Mitigation Site

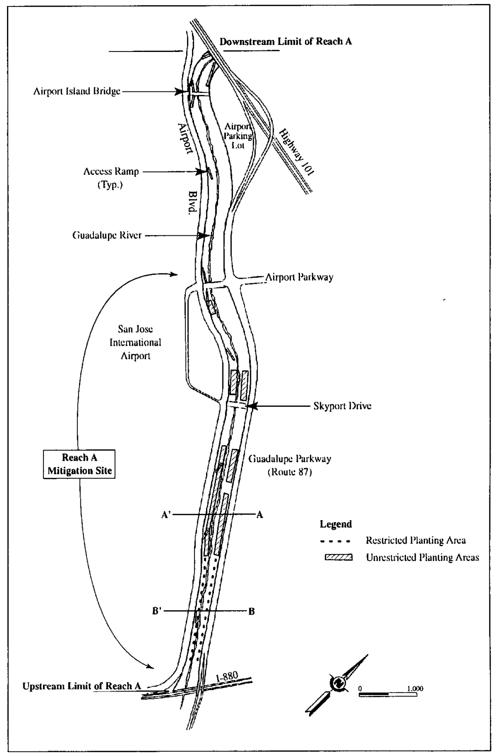


Figure 8.2-2. Offsite Mitigation Areas

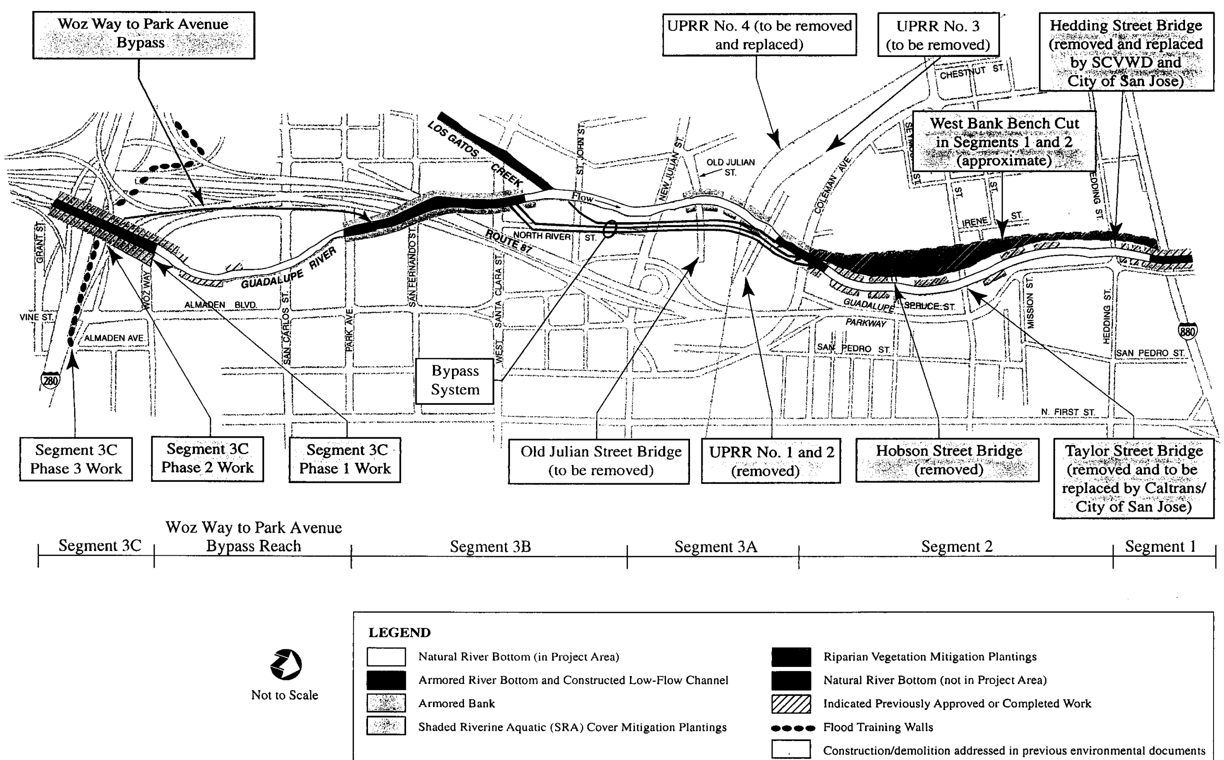


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Figure 8.2-1. Guadalupe River Project with Refined Bypass System Alternative (Proposed Action)
Flood Protection and Onsite Mitigation Components

Acronyms and Abbreviations

ABA	Architectural Barriers Act
ADA	Americans with Disabilities Act
ARB	Air Resources Board
BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management Dist.
B/C	benefit/cost
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CCM	cellular concrete mattress
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CMU	concrete masonry unit
CO	carbon monoxide
Corps	U.S. Army Corps of Engineers, Sacramento District
CNPS	California Native Plant Society
CVP	Central Valley Project
CWA	Clean Water Act
DBH	diameter at breast height
EA	Environmental Assessment
EA/IS	Environmental Assessment/Initial Study
EFH	essential fish habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily significant unit
FONSI	finding of no significant importance
fps	feet per second
FWCA	Fish and Wildlife Coordination Act
GDM	General Design Memorandum
GRR/SEIS-EIR	General Reevaluation Report/ Supplemental Environmental Impact Statement-Environmental Impact Report
HEP	habitat evaluation procedures
HTRW	Hazardous, toxic, and radioactive waste
I-880	Interstate 880
lf	linear feet
LCA	Local Cooperation Agreement
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MHWE	mean high-water elevation
MMP	mitigation monitoring plan
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NDDB	National Diversity Data Base
NED	national economic development
NEPA	National Environmental Protection Agency
NHI	National Heritage Institute
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOP	Notice of Preparation
NO_2	nitrogen dioxide
No_x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
PCB	Polychlorinated biphenyls
PM_{10}	Respirable particulate matter (smaller than 10 microns)
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROG	Reactive organic gases
ROW	right of way
RWQCB	Regional Water Quality Control Board
SCVURPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SCVWD	Santa Clara Valley Water District
SFBBO	San Francisco Bay Bird Observatory
SFBAAB	San Francisco Bay Area Air Basin
SIP	state implementation plan
SO_2	sulfur dioxide
SJRA	San Jose Redevelopment Agency
SR	State Route
SRA	shaded riverine aquatic
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
UPRR	Union Pacific Railroad
USFWS	U.S. Fish and Wildlife Services
USGS	U.S. Geological Survey
WRDA	Water Resources Development Act

Guadalupe Creek Mitigation Site. The proposed Guadalupe Creek mitigation site is located along Guadalupe Creek. It will be a component of the Guadalupe Creek Restoration Project, which is located between Masson Dam and Almaden Expressway (Section 1.6.9, "Guadalupe Creek Restoration Project"). The proposed mitigation site is bordered on the north by residential development and the Los Capitancillos percolation pond system, and on the south by Coleman Road (Figure 3.4-4).

Mitigation at the Guadalupe Creek site is divided into two phases. Phase 1, located at the upstream end of the creek project site, was completed during the winter of 1998-99, as described in Section 3.2.6, "Guadalupe Creek Mitigation Site." Phase 2 extends from Almaden Expressway upstream to the Phase 1 planting site. Phase 2 plantings on Guadalupe Creek would provide an estimated 5, 971 lf of SRA cover vegetation mitigation to be applied to the Guadalupe River Project with Bypass System Alternative. The area of Phase 1 and 2 plantings would total an estimated 12,044 lf. Excess SRA cover vegetation mitigation credits on Guadalupe Creek would be used by SCVWD to mitigate for other projects. Phase 2 is scheduled for implementation in 2001. SCVWD will permanently discontinue the use of gravel spreader dams for instream percolation and recharge of groundwater in Guadalupe Creek. The adjacent groundwater percolation ponds will remain in operation.

The following design elements for Phase 2 are currently being considered:

- Planting native woody riparian vegetation parallel to the creek channel to replace overhead SRA cover lost in the downtown reach
- Using biotechnical techniques to stabilize severely eroded creek banks
- Constructing fish habitat features to replace instream SRA cover lost in the downtown reach and to increase water depth

Biotechnical techniques and fish habitat features include rock weirs and vanes, root wads, and deflector logs. These features, by improving bank stability and increasing instream cover, would improve habitat for the spawning and rearing of aquatic species, including steelhead and chinook salmon.

Ongoing maintenance, such as weed control and irrigation, would be required during the first 3 years postconstruction to assist in the establishment of the plantings. Additional low-level maintenance would most likely be required in perpetuity.

3.4.3 Environmental Commitments

The Corps and SCVWD have incorporated into the Bypass System Alternative specific environmental commitments designed to offset environmental effects associated with the construction of project features. These commitments would include measures to avoid and minimize adverse project effects during construction, measures to compensate for adverse project effects, and an adaptive management program that is part of the mitigation and monitoring plan. Mitigation and monitoring for adverse project effects is considered compensatory, and the Corps and SCVWD are obligated to fulfill these commitments to mitigate project effects. These environmental commitments are equivalent to mitigation measures under CEQA. Detailed effects of the Bypass System Alternative are discussed in Chapter 5, "Environmental Consequences."

SRA cover mitigation components for the Bypass System Alternative were located offsite because of the lack of available mitigation areas in Segments 3A and 3B. SRA cover vegetation for mitigation would be planted onsite in Segments 3A and 3B and offsite in Reach A and Guadalupe Creek.

3.4.3.1 Measures to Avoid and Minimize Adverse Project Effects during Construction

Under the Bypass System Alternative, preventive measures would be implemented to avoid and minimize potential adverse effects on riparian vegetation, including SRA cover vegetation, and aquatic resources during construction of Segments 3A, 3B, and 3C Phase 3. These preventive measures would include implementation of:

- A vegetation protection plan
- An SWPPP
- An erosion and sediment control plan
- A spill prevention and response plan
- Groundwater dewatering and treatment plan
- A soil management plan
- A hazardous and toxic materials contingency plan
- Fish management in the construction area
- Construction period limits
- Measures to comply with the Migratory Bird Treaty Act
- Bay Area Air Quality Management District (BAAQMD) feasible control measures for emissions of respirable particulate matter smaller than 10 microns (PM10)
- Traffic management
- Parking management
- Cultural resources management

The requirements associated with these preventive measures would be included in the construction contractor's plans and specifications. All the measures are in compliance with CDFG Streambed Alteration Agreement Notification No. III-403-91. The measures are discussed below.

Vegetation Protection Plan. A vegetation protection plan would be prepared and implemented as part of the best management practices (BMPs) included in the Guadalupe River Project's construction plans and specifications. The vegetation protection plan would include measures to protect vegetation during construction. Prior to project construction plastic barricade fencing would be erected, or similar measures would be taken, along construction-area boundaries to protect the vegetation to be avoided. If any protected trees are damaged during construction, they would be trimmed under the direction of a qualified arborist to minimize the risk of disease. Trees not approved for removal but damaged beyond recovery during construction would be replaced with trees of the same species or

another species listed on the mitigation plans and specifications in a riparian forest or SRA cover vegetation mitigation area. Replacement ratios will be determined in consultation with the USFWS. The selected construction contractor(s) would be responsible for implementing the plan under Corps oversight (U.S. Army Corps of Engineers, 1999).

Storm Water Pollution Prevention Plan. The Guadalupe River Project is subject to stormwater quality regulations established under the NPDES, described in Section 402 of the Federal CWA. In California, the NPDES program requires that any construction activity disturbing 5 or more acres comply with the statewide General Permit, as authorized by SWRCB (Section 1.5.1.5). The General Permit requires elimination or minimization of nonstormwater discharges from construction sites and the development and implementation of an SWPPP for the site. The primary elements of an SWPPP include:

- Description of site characteristics—including runoff and streamflow characteristics and soil erosion hazard—and construction procedures
- Guidelines for proper application of erosion and sediment control BMPs, including vegetative and structural practices, which are to be delineated on a topographic map
- Description of measures to prevent toxic materials spills
- Description of construction site housekeeping practices

In addition to these primary elements, the SWPPP also specifies that the extent of soil and vegetation disturbance would be minimized by control fencing or other means and that the extent of soil disturbed at any given time would be minimized. The SWPPP must be retained at the construction site. Implementation of the SWPPP would be monitored during Guadalupe River Project construction; upon construction completion, SWRCB would be notified that all State and local requirements were met.

Erosion and Sediment Control Plan. As discussed above, the SWPPP includes measures to minimize erosion and sediment movement into a stream. Increased sediment input to a stream has the potential to adversely affect aquatic species and their habitat. An erosion and sediment control plan would be prepared and implemented by the selected contractor(s). The Corps would oversee implementation of the erosion and sediment control plan. Elements of the plan would require contractors to:

- Conduct all construction work in accordance with site-specific construction plans that minimize the potential for sediment input to the stream
- Identify with construction fencing all areas that require clearing, grading, revegetation, or recontouring and minimize the extent of areas to be cleared, graded, or recontoured
- Grade spoil sites to minimize surface erosion and apply erosion control measures as appropriate to prevent sediment from entering water courses or the stream channel, to the extent feasible
- Mulch disturbed areas as appropriate and plant with appropriate species as soon as practicable after disturbance
- Avoid operating equipment in flowing water by using temporary cofferdams or some other suitable diversion to divert channel flow around the channel and bank construction area

Spill Prevention and Response Plan. As discussed above, the SWPPP includes measures to prevent toxic material spills. Such spills have the potential to adversely affect aquatic species. A spill prevention and response plan that regulates the use of hazardous materials—such as the petroleum-based products used as fuel and lubricants for equipment—and other potentially toxic materials associated with Guadalupe River Project construction would be prepared and implemented by the selected contractor(s). The Corps would oversee implementation of the spill prevention and response plan. Elements of the plan would assure that:

- Workers are trained to avoid and manage spills
- A spill prevention and countermeasure plan will be established and implemented before Guadalupe River Project construction begins; the plan will include strict onsite handling rules to keep construction and maintenance materials from entering the river.
- All spills will be cleaned up immediately and appropriate agencies notified of any spills and cleanup procedures
- Staging and storage areas for equipment, materials, fuels, lubricants, solvents, and other possible contaminants will be located outside the river's normal high-water area
- Vehicles will be removed from the river's normal high-water area before refueling and lubricating
- Vehicles will be immediately removed from work areas if they are leaking
- Equipment will not be operated in flowing water

Groundwater Dewatering and Treatment Plan. Groundwater may be intercepted during excavation for the bypass system's culverts. This ground water would be pumped from the excavation area as required to dewater the construction site. This groundwater may be discharged into the Guadalupe River. The selected construction contractor would prepare and implement a Groundwater Pumping and Treatment Plan under SCVWD supervision, and in accordance with a second NPDES permit. Any groundwater pumping discharge will meet the NPDES groundwater pumping permit requirements for pH, dissolved oxygen, temperature, and will be treated, if necessary, to meet mass daily limits for metals and other constituents.

Soil Management Plan. The soil management plan includes protocols for classifying the content of wastes in soil. These protocols are based on standard analytical tests used for the disposal of material at appropriately licensed disposal sites (CH2MHILL, 1994). The soil management plan also provides criteria for classification of material considered inert, based on California's standard Waste Extraction Test (WET) procedures, as well as procedures for disposal and reuse of these materials. Prior to disposal, confirmation sampling for all constituents of concern, including metals, hydrocarbons, and polynuclear aromatic hydrocarbons, will be conducted and the soil classified pursuant to the criteria outlined in the approved soil management plan.

Prior to project implementation, the soil management plan will be updated to reflect final project design and to incorporate input from RWQCB regarding management of soils containing elevated mercury concentrations. The updated soil management plan will be submitted to RWQCB for approval prior to implementation.

The following additional restrictions on soil management would be included in the soil management plan submitted to RWQCB for their approval:

- Sediments with mercury concentrations that exceed hazardous waste criteria under Federal or State law must be disposed offsite in appropriately licensed disposal sites. The determination of hazardous properties shall comply with all applicable statutes and regulations pertaining to hazardous wastes.
- Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 mg/kg may not be reused onsite unless such soils are placed above the low flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur; above the water surface elevation defined by the 3-year recurrence interval.
- Excavated surfaces above the 3-year recurrence interval elevation that contain mercury concentrations higher than hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for onsite reuse. Excavated surfaces below the 3-year recurrence interval elevation which contain mercury concentrations greater than 1 mg/kg will be overexcavated and replaced with clean imported soil.
- The limitations on onsite reuse of excavated soils and sediments would also apply to operation and maintenance activities throughout the life of the proposed project.

The 1 mg/kg requirement is based on regulatory guidance from RWQCB (California Regional Water Quality Control Board, 2000) which states that reducing bank sediment concentrations of mercury to 1 mg/kg or less will reduce water column concentration of total recoverable mercury. Water quality in the project area presently exceeds Basin Plan numeric water quality objectives for mercury. Therefore, incorporation of the proposed soil reuse restrictions will result in improved water quality under postproject conditions.

Hazardous and Toxic Materials Contingency Plan. Disposal of material excavated from all hazardous, toxic, and radioactive waste (HTRW) sites, discovered within the project limits of the Guadalupe River Project will require special consideration. The Corps, in coordination with SCVWD, will develop a contingency plan outlining a course of action in the event that previously unidentified HTRW sites are uncovered during construction. This contingency plan will outline the immediate course of action to follow in the event HTRWs are uncovered.

Construction – Area Fish Management. A worker education program will be undertaken to emphasize the importance of protecting chinook salmon and steelhead trout and their proposed designated critical habitat. Any activity that temporarily diverts flow from any segment of the river would require implementation of the following constraints:

- Before flow is diverted, culverts and siphons would be in place so that flow to river segments downstream from the construction site would not be interrupted.
- Flow would be incrementally diverted from the affected river segment at the upstream boundary, with diversion progressively increasing over a 4-hour period in the following increments: 50 percent, 75 percent, 90 percent, 95 percent, and 100 percent. Incremental reduction in flow allows fish in the affected river segment to move downstream. Sufficient flow would be maintained through culverts, pumps, or siphons to allow

consistent streamflow in the downstream segments and provide unimpeded passage of juvenile salmon during construction.

- All native aquatic vertebrates and larger invertebrates would be moved by a qualified fisheries biologist prior to dewatering.
- Fish would be removed from pools remaining after flow is diverted from the river segment. A method to capture stranded fish would be developed cooperatively by NMFS, SCVWD, the Corps, and CDFG. Qualified fish biologists would transport captured fish immediately to a flowing river segment. Protocol for capture and release will be developed in cooperation with NMFS, CDFG, and SCVWD. Fisheries biologists would contact NMFS immediately if any steelhead or chinook salmon are found dead or injured, except for spawned-out adult chinook salmon.
- If migrating juvenile chinook salmon and steelhead are detected during June and downstream passage, as determined by a fisheries biologist, may be impeded by construction activities, a fish trap would be placed above the upstream barrier and operated by a fisheries biologist. Detection of migrating juvenile chinook salmon and steelhead during June would be based on their occurrence during any of the previous 14 days in the ongoing downstream migrant trapping (Appendix 3: Mitigation and Monitoring Plan). The trap at the construction site would be removed if juvenile chinook salmon and steelhead were not captured at the construction site or by the ongoing downstream migrant trapping during 14 consecutive days. All migrating steelhead and juvenile chinook salmon would be removed from the trap every 24 hours, or other appropriate time period as determined necessary by a qualified fish biologist to maintain fish in good condition. Captured fish would be counted, measured, and transported immediately to a flowing river segment that allows downstream migration. Additional details of downstream migrant trapping will be coordinated with NMFS, including specific reporting requirements.
- A likely possibility is that adult chinook salmon may arrive at cofferdam sites before the end of construction on October 15. If necessary, upstream passage for chinook salmon would be provided through or around construction sites from September 1 through October 15. The need to provide passage would be based on the occurrence of more than 25 adult chinook salmon, flow conditions, and cooperative assessment of passage needs by NMFS, SCVWD, the Corps, and CDFG. Occurrence of adult chinook salmon will be based on trapping at an appropriate downstream location, or other method developed cooperatively by NMFS, SCVWD, the Corps, and CDFG.

Construction Period Limits. To reduce the likelihood of adverse effects on rearing juvenile steelhead and chinook salmon, as well as on adult fish migrating to upstream spawning areas, in-channel construction, including riverbank and channel bed construction, would be limited to the summer low-precipitation period (April 15 – October 15), with the condition that construction requiring stream dewatering, stream crossings, or work in the channel bed may not commence before May 1. Work could commence on May 1 only if the stream-monitoring criteria were satisfied by that date. Stream monitoring criteria include monitoring to determine whether average daily water temperatures have exceeded 68 °F for at least 5 consecutive days and whether outmigrating salmonids are absent. Absence of juvenile chinook salmon and steelhead during May would be based on observations during the previous 14 days in the ongoing downstream migrant trapping (Appendix 3: Mitigation

and Monitoring Plan). Generally, conditions for steelhead and chinook salmon decline when water temperatures exceed 68 °F in spring. Should stream-monitoring criteria not be met, channel work and stream dewatering would not be allowed to commence until June 1. If necessary, upstream passage for chinook salmon would be provided through or around construction sites from September 1 through October 15. The need to provide passage would be based on the presence of adult chinook salmon, flow conditions, and cooperative assessment of passage needs by NMFS, SCVWD, the Corps, and CDFG. Construction outside the summer low-precipitation period would require previous approval from CDFG and NMFS.

Measures to Comply with Migratory Bird Treaty Act. The Bypass System Alternative will be constructed inside habitat used by migratory birds. Project construction activities will not pursue, hunt, attempt to take, kill, capture, collect, possess, or offer for sale any migratory bird, including feathers, parts, nests, or eggs. Migratory birds, eggs, and active nests will be avoided by removing potential nesting vegetation inside the construction area boundaries prior to or after the February 16 to July 31 migratory bird nesting season. Barricade fencing erected as part of the Vegetation Protection Plan will protect nesting vegetation located outside of the construction area boundaries. In addition, if construction is initiated during the February 16 to July 31 migratory bird nesting season, a qualified biologist will survey the construction area for eggs or young migratory birds just prior to construction. If eggs or migratory birds are found inside the construction area boundaries, the Corps and SCVWD will develop protective measures and inform CDFG of their actions.

Measures to Implement BAAQMD's Feasible Control Measures for PM10 Emissions from Soil Removal Activities. The following list of measures for controlling emissions of PM10 would be implemented during the construction phase of the project. These measures are contained in BAAQMD's Feasible Control Measures for PM10 Emissions from Soil Removal Activities (Bay Area Air Quality Management District, 1996).

- Water all active construction sites at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least 2 feet of freeboard.
- Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Measures to Address Traffic-Related Effects. The contractor(s) would submit a traffic control plan. Three lanes of West Santa Clara Street would remain open during the construction period. Two of the three open lanes would move in the direction of peak traffic flow. This measure would be implemented during the peak travel periods from 6:30 a.m. to 8:30 a.m. and from 4:30 p.m. to 6:30 p.m. and during large events at the San Jose Arena, as required by the City (City of San Jose, 1994).

Prior to the onset of construction, signs with the construction periods clearly displayed would be posted on New Julian Street and West Santa Clara Street warning commuters of

potential construction delays. During construction, signs would be posted at access points to West Santa Clara Street to notify drivers of alternative routes. This measure would help to divert traffic around potentially congested areas on West Santa Clara Street.

Measures to Address Temporary Loss of Parking. A shuttle service would be implemented to mitigate for the temporary loss of parking at the office park under construction at the intersection of 333 New Julian Avenue and Guadalupe Parkway. A parking lot or lots that could accommodate an additional 75 cars would be identified, and a continuous shuttle service between the parking lot(s) and the office park would be instituted during work hours.

Measures to Address Cultural Resources. An archeologist meeting the Secretary of the Interior's Standards for Professional Archeologists would monitor the project during ground-disturbing activities. If a prehistoric archeological site should be discovered, the site would be evaluated for significance under NRHP criteria. A Native American monitor would also be present during the evaluation of the site's significance. If human remains of Native American origin should be discovered during project construction, procedures identified in the California State public health and safety codes would be followed. These procedures include notifying the County Coroner and the Native American Heritage Commission. The Commission would appoint a "most likely descendant" to make recommendations for treatment of the remains. Work in the area would be stopped until the site is treated.

If prehistoric or historic archeological sites that appear eligible for NRHP should be discovered, procedures stipulated under implementing regulations for NHPA (36 CFR 800) would be followed. These procedures would include consulting with the California State Historic Preservation Officer to confirm eligibility of the site(s) for the National Register and development of a Memorandum of Agreement that specifies treatment for the site(s). Treatment could comprise data recovery, site avoidance, or, possibly, capping the site to avoid further impacts.

3.4.3.2 Measures to Compensate for Adverse Project Effects

The environmental commitments designed to compensate for adverse project effects are described below. If the Bypass System Alternative is not selected, these would be implemented to a lesser degree, as described in Section 3.3.3, "Environmental Commitments."

Planting of Riparian Vegetation. Construction of the Bypass System Alternative would result in the loss of 5.76 acres of riparian vegetation.

For the entire Guadalupe River project, a total of 21 acres of riparian habitat mitigation has been established in Segments 1 and 2. In 1994 and 1999, approximately 4.0 acres of native riparian vegetation was planted in the bench-cut area on the western side of the river in Segment 1. In 1998, approximately 17.0 acres of native riparian vegetation was planted in the natural soil floodplain terrace areas on the western side of the river in Segment 2. The riparian vegetation plantings installed in 1999 were drip irrigated with water from existing City waterlines; irrigation was discontinued in winter 1999. The riparian vegetation planted in 1994 is no longer being irrigated. Determination of mitigation requirements for the Bypass System Alternative are explained in Section 5.4.3, "Bypass System Alternative."

Planting of SRA Cover. Construction of the Bypass System Alternative would result in the loss of 3,861 lf of SRA cover vegetation. SRA cover vegetation would be planted both onsite and offsite. SRA cover vegetation mitigation plantings would be located in natural bank or biotechnical bank stabilization areas and would be dense enough to provide shade along at least 85 percent of the bank's length. Species used in SRA cover vegetation mitigation would be native to the Guadalupe River area.

Onsite SRA cover vegetation mitigation includes planting 575 lf of riparian vegetation in Segment 1, 1,081 lf in Segment 2, 878 lf in Segment 3A, and 410 lf in the Woz Way to Park Avenue bypass reach. Offsite SRA cover vegetation mitigation includes planting 7,848 lf of riparian vegetation in Reach A and 12,044 lf along Guadalupe Creek. SRA cover vegetation mitigation consists of planting native riparian vegetation within 5 feet of the base-flow water-surface elevation. Biotechnical bank stabilization measures will be implemented at an infill planting site in Segment 1 downstream from Hedding Street and in Segment 2 downstream from Taylor Street. Biotechnical bank stabilization measures will also be implemented in Reach A downstream from old Airport Parkway. Along Guadalupe Creek, instream geomorphic features, including rock weirs and vanes, root wads, and deflector logs, would also be installed in sections of natural channel bed to replace affected SRA cover vegetation. These features, by improving bank stability and increasing instream cover, would provide expanded and improved habitat for the spawning and rearing of aquatic species, including steelhead and chinook salmon.

For the entire Guadalupe River Project, a total of 18,026 lf will be planted for mitigation of SRA cover vegetation impacts. Determination of SRA mitigation requirements for the Bypass System Alternative are explained in Section 5.4.3, "Bypass System Alternative."

Protection of the Project's Compensatory Mitigation Sites. The conditional water quality certification for the Guadalupe River Project issued by SWRCB in 1992 requires in Condition 2.b.vii, "specifications of how compensatory mitigation sites would be guaranteed protection in perpetuity from potential recreational and other urban impacts." After a 3-year establishment period monitored by the Corps, SCVWD will be responsible for the management and protection of all mitigation sites in perpetuity. No trails will be constructed in the mitigation areas, and recreational use would be prohibited in both onsite and offsite riparian vegetation and SRA cover vegetation mitigation sites. However, because many of the onsite mitigation sites would be located near Guadalupe River Park, recreational activities, including nature viewing and walking/riding on trails, would take place in the vicinity of the mitigation sites. This would also be the case with Guadalupe Creek, where informal recreation in the form of walking and jogging occurs regularly along a levee/maintenance road that runs adjacent to the creek. It is anticipated that such activities would not substantially affect the performance of the mitigation sites. Several options would be used to protect mitigation sites from recreational and other urban impacts. These would include the use of signage, fencing, barrier plantings, and designated access routes. Each option would be considered for each mitigation site, and the most appropriate method for each site would be selected in coordination with the resource agencies. Additional details are described in Appendix 3 (Mitigation and Monitoring Plan).

Implement Water Temperature Measures. SRA cover vegetation would be planted to mitigate for shade lost as a result of project construction. SRA cover vegetation mitigation will be planted within Segments 1, 2, 3A, and 3B, in Reach A, and along Guadalupe Creek. SRA cover vegetation would grow and begin to provide shade before year 5 and would reach

maturity and maximum shade density after year 40. Increasing shade along the river is expected to result in lower overall water temperature. During the establishment period and beyond, there will be ongoing monitoring and, if needed, remedial actions as outlined in the MMP (Appendix 3). The addition of invert stabilization structures in Segments 3A and 3B will also increase the water depth, contributing to the maintenance of water temperature.

Replace Spawning Gravel. Up to 25,190 sf (approximately 465 cubic yards) of river-run gravel would be restocked in areas shaded by vegetation in Segments 2, 3A, and 3B. Gravel would be restocked when gravel coverage dropped below approximately 20,000 sf; gravel would be replaced in quantities sufficient to meet the target of 25,190 sf. Restocking would take place between June 15 and August 31 to avoid potential adverse effects on salmonids that might be present in the river earlier in the year. Gravel would be purchased from existing aggregate suppliers or may be supplied from other SCVWD projects. Gradient-control structures placed in the unarmored sections of the channel bed would promote natural gravel deposition.

Implement Fish Passage Measures. A constructed low-flow channel would be installed in armored sections of the river invert to provide fish passage through Sections 3A and 3B, as described in Section 3.4.2.3, "Low-Flow Channel with Check Structures."

Existing physical barriers to fish passage through the area affected by the Bypass System Alternative and to upstream mitigation sites would be removed or modified to maintain passage. As part of the Bypass System Alternative, the USGS gaging weir located near the St. John Street Bridge would be removed and relocated and an exposed gas and sewer line that crosses the river near the Old Julian Street Bridge would be relocated. The Alamitos drop structure downstream from Almaden Lake was modified in 1999 by SCVWD as part of another project and now permits fish passage to the upper tributaries of the Guadalupe River, including the mitigation site on Guadalupe Creek.

Implement Fish Habitat Measures. Several compensatory mitigation components would maintain and replace aquatic habitat used by fish. The instream geomorphic features proposed for Guadalupe Creek would improve bank stability and increase instream cover, thereby improving spawning and rearing habitat for aquatic species, including steelhead and chinook salmon. These instream geomorphic features include rock weirs and vanes, root wads, and deflector logs. The low-flow channel check structure design would increase instream cover and provide improved spawning and rearing habitat through the creation of pools and riffles in the armored channel bed sections of Segments 3A and 3B. Installation of the invert stabilization structures proposed for the natural-bottom sections of Segments 3A and 3B would also provide improved spawning and rearing habitat through the formation of pools and riffles.

3.4.3.3 Adaptive Management Program

Adaptive management has been included as an essential component of the Bypass System Alternative to facilitate achievement of mitigation objectives and to provide for implementation of remedial actions if the mitigation objectives are not achieved. The objective of adaptive management is to ensure that habitat values and ecological functions affected by the Guadalupe River Project with Bypass System Alternative are reestablished. The MMP (Appendix 3) includes detailed information on the adaptive management components and objectives for the Guadalupe River Project.

3.4.4 Operation and Maintenance

The Guadalupe River Project was designed with the assumption that the river downstream from I-880 could convey the authorized design floodflow of approximately 17,000 cfs. After the January and March 1995 storms, SCVWD completed an analysis that indicated that the lower Guadalupe River, below I-880, did not have the capacity to convey the authorized design floodflow of 17,000 cfs. From the town of Alviso to Trimble Road, there is an approximately 40 percent reduction in channel capacity. Sediment deposition and vegetation growth, which resulted from deferral of maintenance, were identified as the main causes of reduced channel capacity.

The Lower Guadalupe River Project, which is scheduled for completion before or concurrently with the completion of the Guadalupe River Project is planned to include the restoration of channel capacity in the lower Guadalupe River. SCVWD is currently developing the components of the Lower Guadalupe River Project (Section 1.6.8, "Lower Guadalupe River Flood Protection Project"). The Lower Guadalupe River Project would restore the capacity required to convey the Guadalupe River design floodflows; therefore, no Guadalupe River Project flood protection components would be made operational until the Lower Guadalupe River Project is completed. Inlets and outlets for the bypasses in Segments 3A and 3B would remain closed with bulkhead retaining walls. The flood training walls in Segment 3C Phase 3 would not be completed until completion of the Lower Guadalupe River Project.

3.4.4.1 Operation

Once the Guadalupe River Project is operational, bypass culverts would remain in an open condition year-round. Flood training walls in Section 3C Phase 3 would be manually closed prior to river overbanking. Once closed, these training walls would channel floodwaters into the Guadalupe River. The bypass system, including the Woz Way to Park Avenue bypass, would become operational at a minimum of 1,500 cfs, as described in Section 3.4.2.1, "Bypass System."

When the Upper Guadalupe River Project is completed by SCVWD, street closure operations for the training walls would no longer be needed because the Upper Guadalupe River Project would prevent the overbank flows that the training walls are designed to collect.

3.4.4.2 Maintenance

S CVWD currently conducts limited channel maintenance activities on the Guadalupe River between I-280 and I-880, including the downtown reach and the Reach A mitigation site. When all designs, plans, and specifications for the Bypass System Alternative are finalized in 2001, the Corps and SCVWD would develop a Final Operation and Maintenance Manual (Final O&M Manual) for maintaining the project elements. This Final O&M Manual would require SCVWD to preserve the as-built design of the Bypass System Alternative, and would likely include the on-going maintenance procedures currently used by SCVWD, as well as all MMP requirements (Appendix 3). This Final O&M Manual would replace the Interim Operation and Maintenance Manual presently used by SCVWD for the already completed segments of the Guadalupe River Project (U.S. Army Corps of Engineers, 1997). SCVWD, as the local sponsor, has agreed to perform these Project operation and maintenance responsibilities for the life (100 years) of the project. The Final O&M Manual

would also provide for maintenance of the recreation elements of the Bypass System Alternative. Following the execution of a separate agreement, the operation and maintenance responsibilities for the recreation elements would be transferred from SCVWD to the City of San Jose.

While the nature and extent of required maintenance would be determined in the Final O&M Manual, it is not expected that there would be any significant change from the maintenance activities currently conducted in the project area. Current procedures generally include removal of large woody debris blocking or impeding floodflow, removal of accumulated sediment, and bank stabilization. Sediment removal, if required, is performed from the top of bank or from existing access points to avoid impacts on bank vegetation, and performed in compliance with a Streambed Alteration Agreement with CDFG. Bank stabilization measures are implemented only when necessary to protect adjacent properties and public facilities.

As described in Section 5.2.3.1, "Channel Erosion and Deposition," the Bypass System Alternative is not expected to cause bank erosion, or result in any substantial change in the amount of sediment deposition presently occurring in the project area. Therefore, debris removal, sediment removal, and bank stabilization activities would not change after the Bypass System Alternative is implemented. As described in Section 1.6.15, "Santa Clara Valley Water District Stream Maintenance Program," SCVWD is developing a Programmatic EIR for their Stream Maintenance Program that will address the potential effects of on-going channel maintenance in the entire Guadalupe River, including the project area. Continuance of the existing maintenance practices, including bank stabilization and sediment and woody debris removal, are the only regular maintenance activities that would be required for maintenance of the as-built designs of the river channel specified in the Bypass System Alternative.

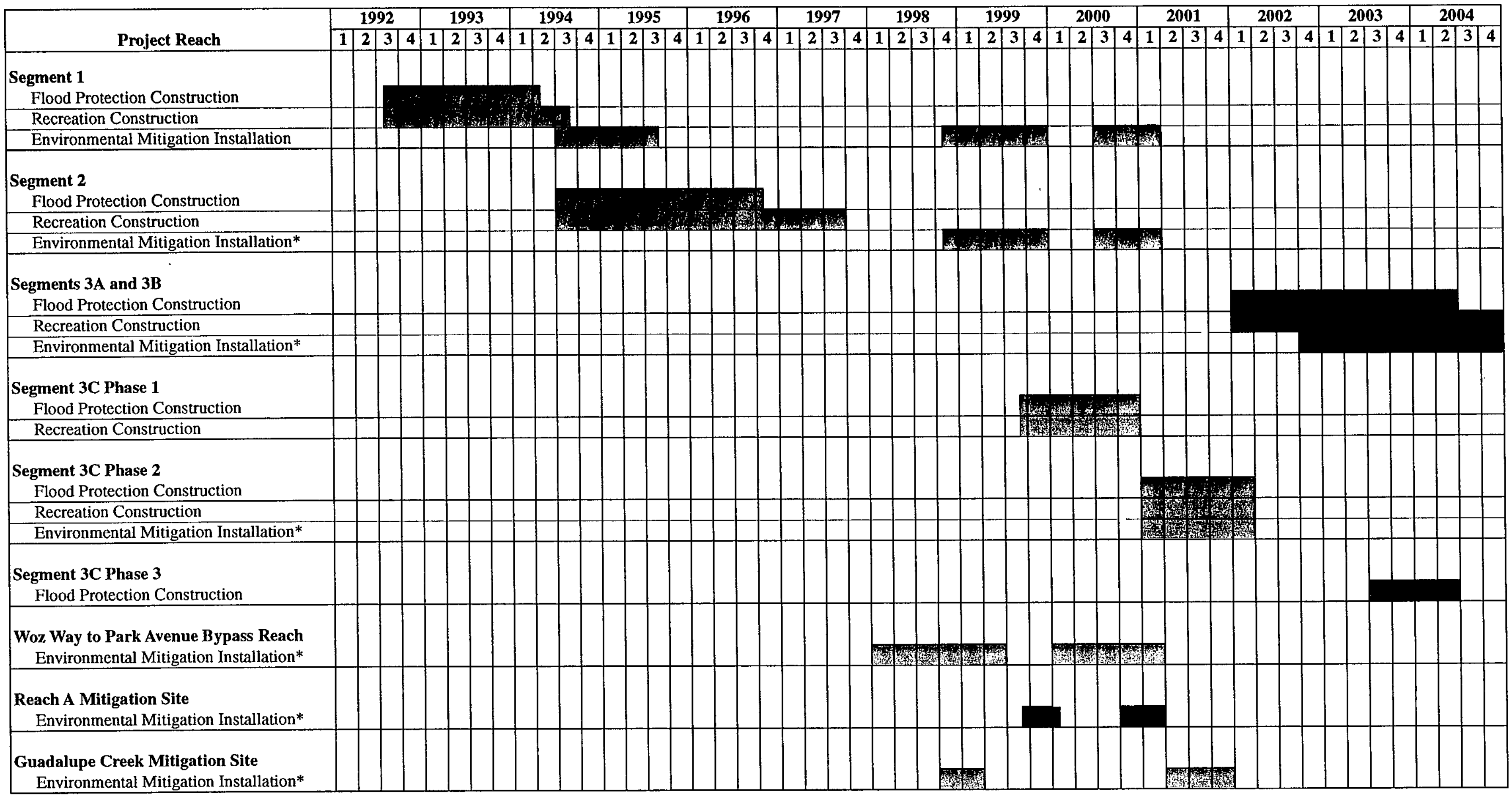
3.4.5 Project Construction Schedule

The schedule for the Guadalupe River Project with Bypass System Alternative is illustrated on Figure 3.4-10. Bypass System Alternative Segments 3A and 3B would be constructed from 2002 through 2004, and Segment 3 Phase 3 would be constructed in 2003 through 2004.

The schedule for mitigation for the Guadalupe River Project with Bypass System Alternative is also illustrated on Figure 3.4-10. Riparian mitigation was installed prior to 1999. Installation of SRA cover vegetation mitigation, which began in 1999, will continue through 2004. Installation of anadromous fish habitat mitigation will continue through 2004 (U.S. Army Corps of Engineers, 1992).

3.5 Refined Bypass System Alternative (Proposed Action)

The Refined Bypass System Alternative, now the Proposed Action, would include all the flood protection features constructed as part of the Bypass System Alternative, except for the armoring (gabions) of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge (Figure 3.5-1). This alternative would include the bypass system and other flood protection features discussed in Section 3.4, "Bypass System Alternative," and would be designed to meet the project objective of conveying the design floodflow of 17,000 cfs. Channel bank armoring under the Refined Bypass System Alternative would total approximately 5,332 lf or 200 lf less than under the Bypass System Alternative.



* Includes installation of riparian vegetation, shaded riverine aquatic (SRA) cover, fish habitat, or spawning gravels in these reaches.

Notes:

1 After implementation of the identified mitigation components, a 3-year monitoring program will ensure the successful establishment of the mitigation features and to provide necessary adjustments, if any.

2 Operation and maintenance of project features and mitigation monitoring and management will be provided by the SCVWD, in cooperation with the Adaptive Management Team, as described in the accompanying Mitigation Monitoring Plan (Volume 2) over the project life.

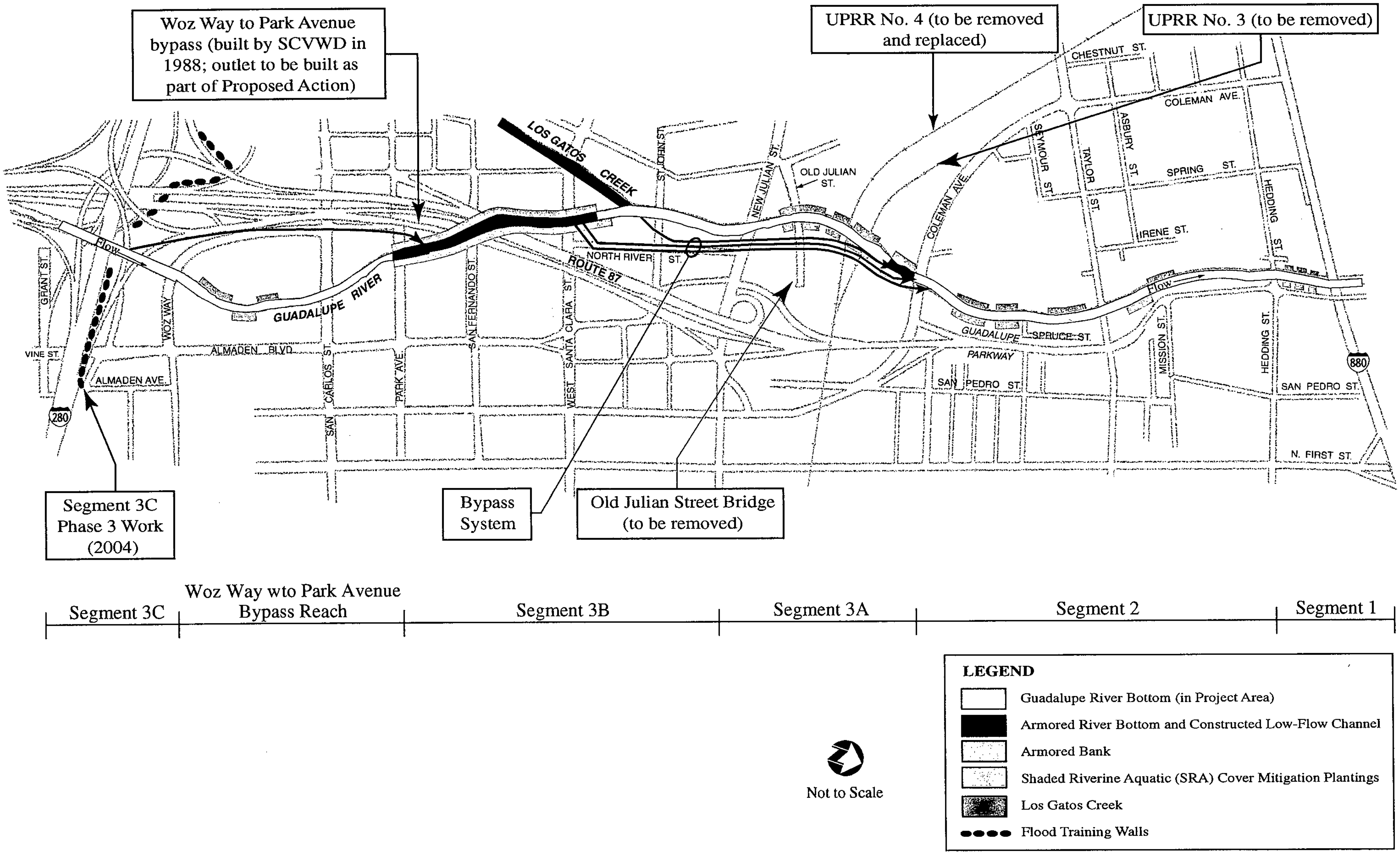
3 Mitigation installation is behind schedule in Segments 1 and 2 because original plantings were placed in the incorrect positions.

Legend

- Key features of Proposed Action
- Portion of Guadalupe River Project with Proposed Action previously implemented or begun
- Feature implemented by SCVWD

Revised

Figure 3.4-10. Guadalupe River Project - Schedule for Flood Protection and Recreation Construction and Mitigation Installation



Revised

Figure 3.5-1. Refined Bypass System Alternative (Proposed Action) Flood Protection and Onsite Mitigation Components

TABLE 3.6-1 Project Features of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative

Activity	No-Action Alternative	Bypass System Alternative	Refined Bypass System Alternative (Proposed Action)
Achieves Flood Protection Objectives	No	Yes	Yes
Material Excavated			
River Channel	Unknown	30,000 cubic yards	30,000 cubic yards
Bypass System	0	341,900 cubic yards	341,900 cubic yards
Subtotal		371,900 cubic yards	371,900 cubic yards
Bridges Removed	1 street bridge	2 street bridges and 2 railroad bridges	2 street bridges and 2 railroad bridges
Riverbank Armoring			
Segment 1			
West Bank	448 lf	0 lf	0 lf
East Bank	448 lf	0 lf	0 lf
Segment 2			
West Bank	305 lf	0 lf	0 lf
East Bank	305 lf	0 lf	0 lf
Segment 3A			
West Bank	0 lf	695 lf	695 lf
East Bank	0 lf	745 lf	695 lf
Segment 3B			
West Bank	0 lf	1,861 lf	1,861 lf
East Bank	0 lf	2,231 lf	2,081lf
Segment 3C			
West Bank	1,250 lf	0 lf	0 lf
East Bank	1,085 lf	0 lf	0 lf
Subtotal	3,841 lf	5,532 lf	5,332 lf
Riverbed Armoring			
Segment 1	448 lf	0 lf	0 lf
Segment 2	305 lf	0 lf	0 lf
Segment 3A	0 lf	695 lf	695 lf
Segment 3B	0 lf	1,861 lf	1,861 lf
Segment 3C			
Phase 1	0 lf	0 lf	0 lf
Phase 2	1,045 lf	0 lf	0 lf
Phase 3	0 lf	0 lf	0 lf
Subtotal	1,798 lf	2,635 lf	2,635 lf
Invert Stabilization Structures	0	9-15a 9-20b	9-15a 9-20b
Bypass			
A	0 lf	5,000 lf	5,000 lf
B	0 lf	4,000 lf	4,000 lf
C	0 lf	2,500 lf	2,500 lf
Trails [c]	7,000 lf	16,000 lf	16,000 lf

Resource	No-Action Alternative	Bypass System Alternative	Refined Bypass System Alternative (Proposed Action)
Riparian Vegetation			
- effect (loss)	8.36 acres	5.76 acres	5.41 acres
- mitigation	21 acres	21 acres	21 acres
SRA Cover Vegetation			
- effect (loss)	4,526 lf	3,861 lf	3,789 lf
- mitigation	unknown [d]	22,836 lf [e]	22,836 lf [e]
Fish Spawning Habitat			
- effect (loss of spawning gravel)	720 sf	11,200 sf	11,200 sf
- mitigation (replace spawning gravel)	up to 5,090 sf	up to 25,190 sf	up to 25,190 sf

[a] Segments 3A and 3B
[b] Segments 1 and 2
[c] Trail lengths are approximate and rounded to nearest 1,000 feet.
[d] If the No-Action Alternative is selected, an additional SRA HEP analysis would be performed to ensure the planting of necessary SRA cover vegetation. A total of 3,006 lf of SRA cover vegetation was planted through 1999.
[e] Total mitigation for the entire Guadalupe River Project is based on a HEP analysis and equals 18,026 lf.
Source: U.S. Army Corps of Engineers, 1991b

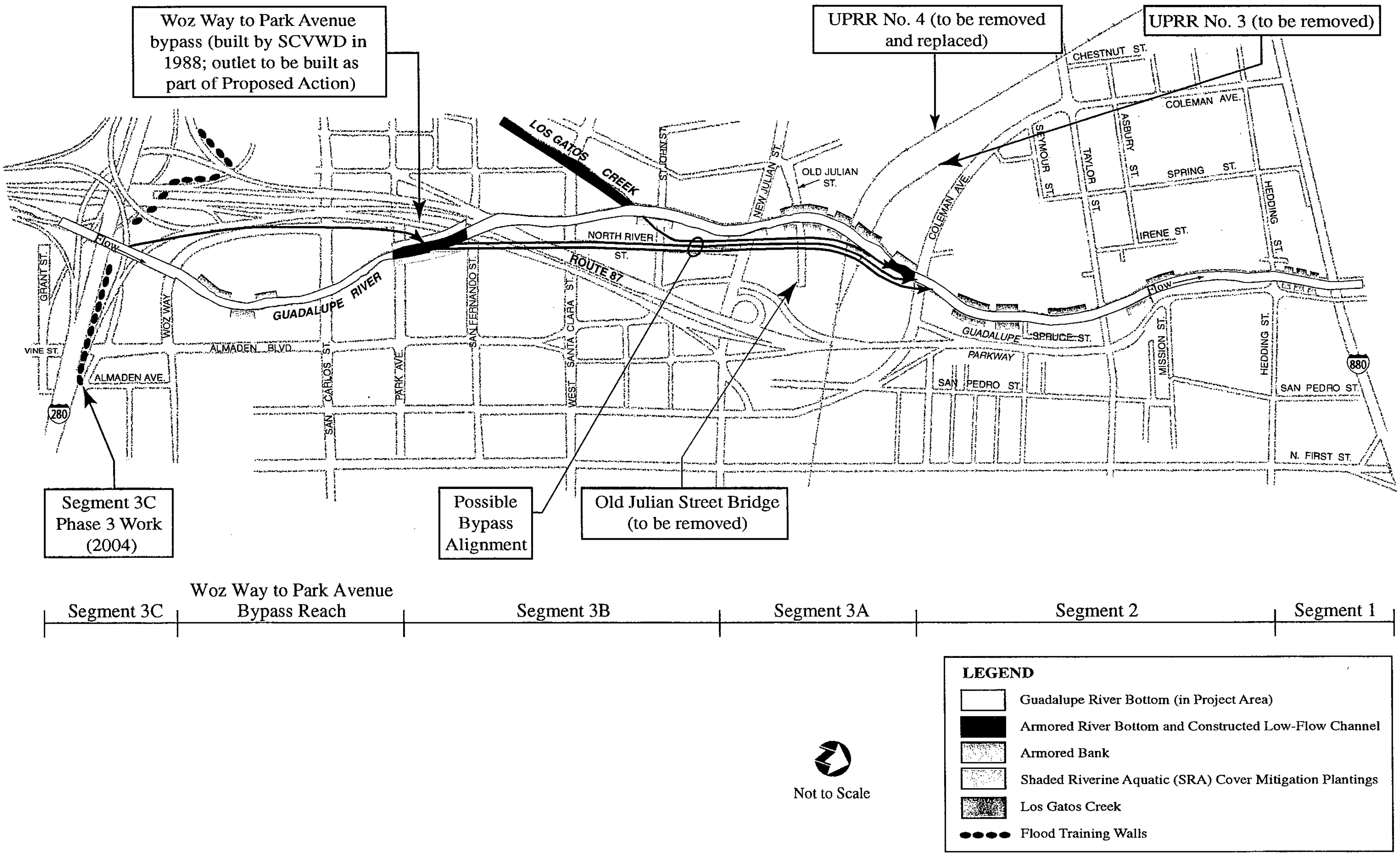


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Figure 3.7-1. Extended Bypass Alternative Flood Protection and Onsite Mitigation Components

The inlets to bypass culverts A and B would be moved upstream near the outlet of the Woz Way to Park Avenue bypass reach (Figure 3.7-1). The amount of channel bank and channel bed armoring in Segment 3B would be substantially reduced. This alternative would include the other flood protection features discussed in Section 3.5, "Refined Bypass System Alternative," and would be designed to meet the project objective of conveying the design floodflow of 17,000 cfs.

The bypass culverts would cross under San Fernando and West Santa Clara Streets and under State Route 87, where they would rejoin the alignment described in the Refined Bypass System Alternative. The length of each bypass culvert would increase by approximately 2,000 feet. The Extended Bypass Alternative would require extensive and lengthy coordination with Caltrans before the possible removal of support piers for State Route 87 between West Santa Clara Street and Park Avenue to construct the bypass. Removing the piers would make it necessary to reconstruct a portion of State Route 87 between West Santa Clara Street and Park Avenue. Traffic on State Route 87 would have to be rerouted to surface streets during construction.

Table 3.7-1 provides a comparison of the amount of riverbank and channel bed armoring that would be constructed under the Extended Bypass Alternative with the amount of armoring under the Proposed Action. Extending the inlets to bypass culverts A and B upstream would eliminate the need to armor the riverbank and channel bed from West Santa Clara Street downstream to the confluence with Los Gatos Creek. Channel bank armoring under the Extended Bypass Alternative would total approximately 2,710 lf, or 2,622 lf less than under the Refined Bypass System Alternative. Riverbed armoring under the Extended Bypass Alternative would total approximately 1,419 lf, or 1,137 lf less than under the Refined Bypass System Alternative.

A discussion of the impacts of this alternative is included in Section 5.16, "Analysis of Alternatives."

3.8 Identification of the Environmentally Preferred and Environmentally Superior Alternative

The Corps and SCVWD have identified the Refined Bypass System Alternative as the environmentally preferred and environmentally superior alternative, pursuant to the requirements of NEPA and CEQA, respectively. The environmentally preferred and environmentally superior alternative is the alternative that causes the least damage to the biological and physical environment and protects, preserves, and enhances historic, cultural, and natural resources while accomplishing the project's objectives. The Refined Bypass System Alternative is considered the environmentally preferred and environmentally superior alternative because it would accomplish flood protection goals while maintaining water temperatures, provide habitat for endangered fish species, and provide recreational opportunities. The Refined Bypass System Alternative would result in a slight decrease in bank armoring and reduced impacts on riparian vegetation and SRA cover vegetation compared to the Bypass System Alternative. Although the No-Action Alternative would result in fewer direct environmental impacts, it would not meet the objectives to provide 100-year flood protection to downtown San Jose, maintain/improve water temperatures, restore/provide habitat for endangered fish species, and provide recreational opportunities.

TABLE 3.7-1. Comparison of Riverbank and Riverbed Armoring for the Refined Bypass System Alternative and the Extended Bypass Alternative

	Refined Bypass System Alternative		Extended Bypass Alternative		Difference	
Location	**Riverbank (lf)**	**Riverbed (lf)**	**Riverbank (lf)**	**Riverbed (lf)**	**Riverbank (lf)**	**Riverbed (lf)**
Segment 3A	1,390	695	1,390	695	0	0
Segment 3B	3,942	1,861	1,320	724	2,572	1,216
Totals	5,332	2,556	2,710	1,419	2,572	1,216

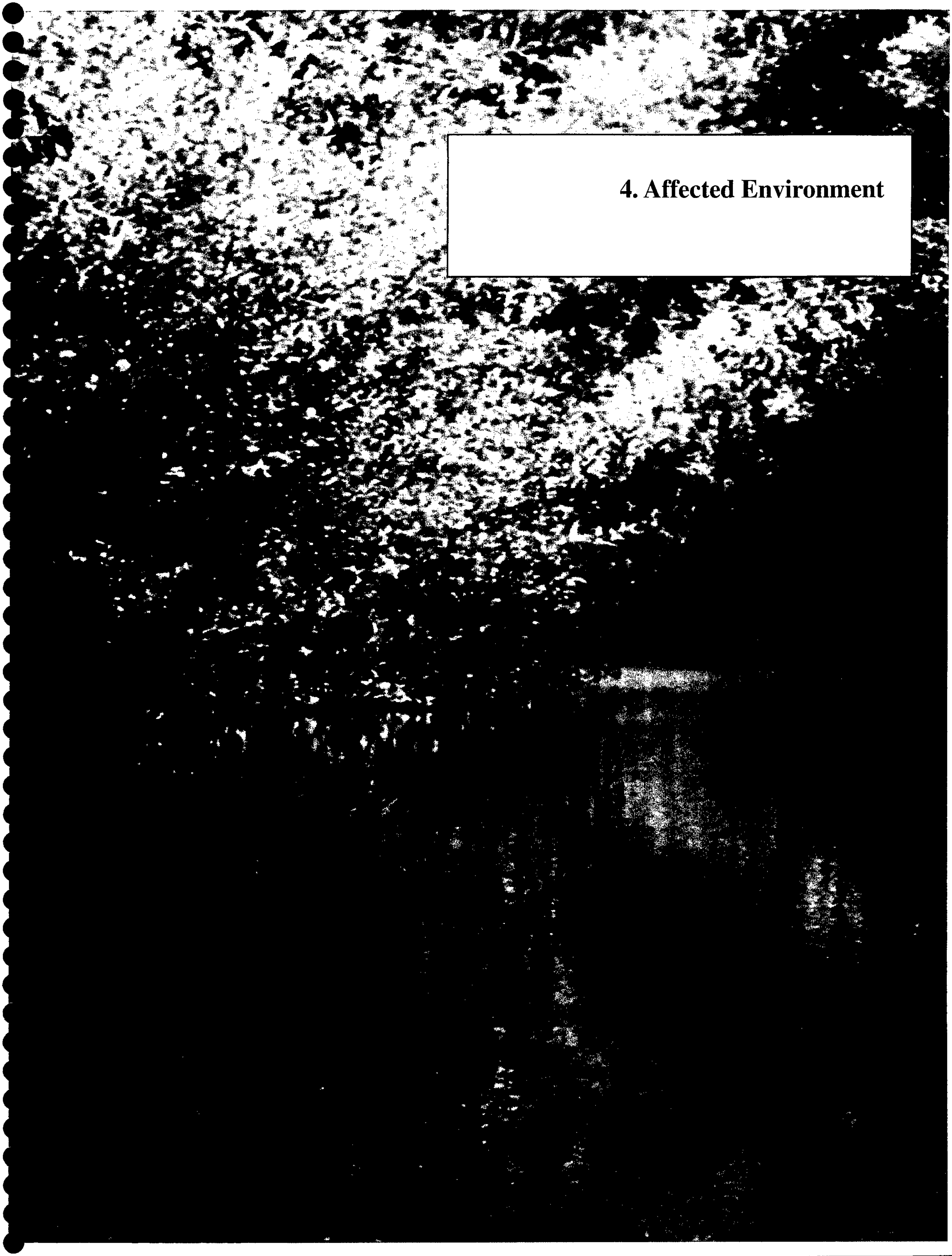
Assumptions:

Extended Bypass Alternative:

1. In Segment 3B, channel bed armoring will be installed between Park Avenue and San Fernando Street.
2. In Segment 3B, riverbank armoring will be installed between Park Avenue and San Fernando Street and 450 feet upstream from the New Julian (east bank only).

The selection of the Refined Bypass System Alternative as the environmentally preferred and environmentally superior alternative is based on the conclusions of the impact analysis presented in Chapters 5 and 6 of this Report. In addition, the development of the Bypass System Alternative and the Refined Bypass System Alternative included an extensive alternatives screening process. This process, discussed in Chapter 2, "Development and Evaluation of Alternatives," concluded that the Bypass System Alternative and the Refined Bypass System Alternative presented in this Report are the only feasible alternatives that would meet the specified flood protection, environmental, and recreation objectives.

4. Affected Environment



KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions in Chapter 4:

Additional information is presented on (1) existing hazardous material locations in the project area and (2) location of historic cinnabar mines and the condition of mercury-laden soils in the Guadalupe River watershed.

The Refined Bypass System Alternative is now identified as the Proposed Action alternative. This change was made after the Refined Bypass System Alternative was found to be environmentally superior, environmentally preferable, and less costly during the lead agencies' review of the Draft Report.

Specific responses to comments on the Draft Report are presented in Appendix 4 (Volume 2) with highlights and strikeouts showing where portions of the Draft Report were modified as reflected in this Final Report.

CHAPTER 4

Affected Environment

4.1 Hydrologic and Hydraulic Conditions

4.1.1 Hydrologic Conditions

4.1.1.1 Basin Physiography

The Guadalupe River basin is located in Santa Clara County at the south end of San Francisco Bay (Figure 4.1-1). The basin covers an area of approximately 160 square miles above the river's confluence with Coyote Creek near San Francisco Bay and 144 square miles above the USGS gaging station on the Guadalupe River in downtown San Jose, located just upstream from the St. John Street Bridge (Guadalupe River at San Jose gage). The basin is bounded on the south by the Diablo Range, on the west by the Santa Cruz Mountains, on the east by Coyote Creek, and on the north by San Francisco Bay. Basin relief is approximately 3,800 feet, with the highest point near Loma Prieta in the Santa Cruz Mountains and the lowest point below sea level near Alviso on San Francisco Bay. The basin is characterized by a perimeter of high, steep, natural slopes with a large, wide valley below.

The Guadalupe River originates at the confluence of Guadalupe and Alamitos Creeks at Almaden Lake on the southern side of San Jose near the intersection of Coleman Road and Almaden Expressway (Figure 4.1-1). From its origin, the river drains north through the heavily populated Santa Clara Valley toward San Francisco Bay. Major tributaries to the Guadalupe River are Ross, Canoas, and Los Gatos Creeks. The Guadalupe River reaches San Francisco Bay near Alviso, where conditions change abruptly from densely urbanized municipal and residential land uses to salt evaporation ponds and tidal sloughs bordered by tidal marsh. The tidal influence of San Francisco Bay extends up the Guadalupe River approximately 6.5 miles to about the Montague Expressway, which is approximately 4 miles downstream from the I-880 bridge and the Guadalupe River Project. The downtown reach is about 12 miles upstream from San Francisco Bay, and the river flows in the downtown reach are not tidally influenced. The hydrology of the basin has been greatly altered by human activity. In 1929, the Santa Clara Valley Water Conservation District (SCVWCD) was created to alleviate land surface subsidence in and around San Jose caused by groundwater overdraft. In 1933, the SCVWCD initiated a construction program to build recharge ponds and five dams and reservoirs in the Guadalupe River basin. Calero, Almaden, Guadalupe, and Vasona Reservoirs were completed in 1935, and Lexington Reservoir was completed in 1952. These reservoirs and recharge ponds were designed to capture winter rains to recharge groundwater aquifers. The reservoirs have a combined storage capacity of

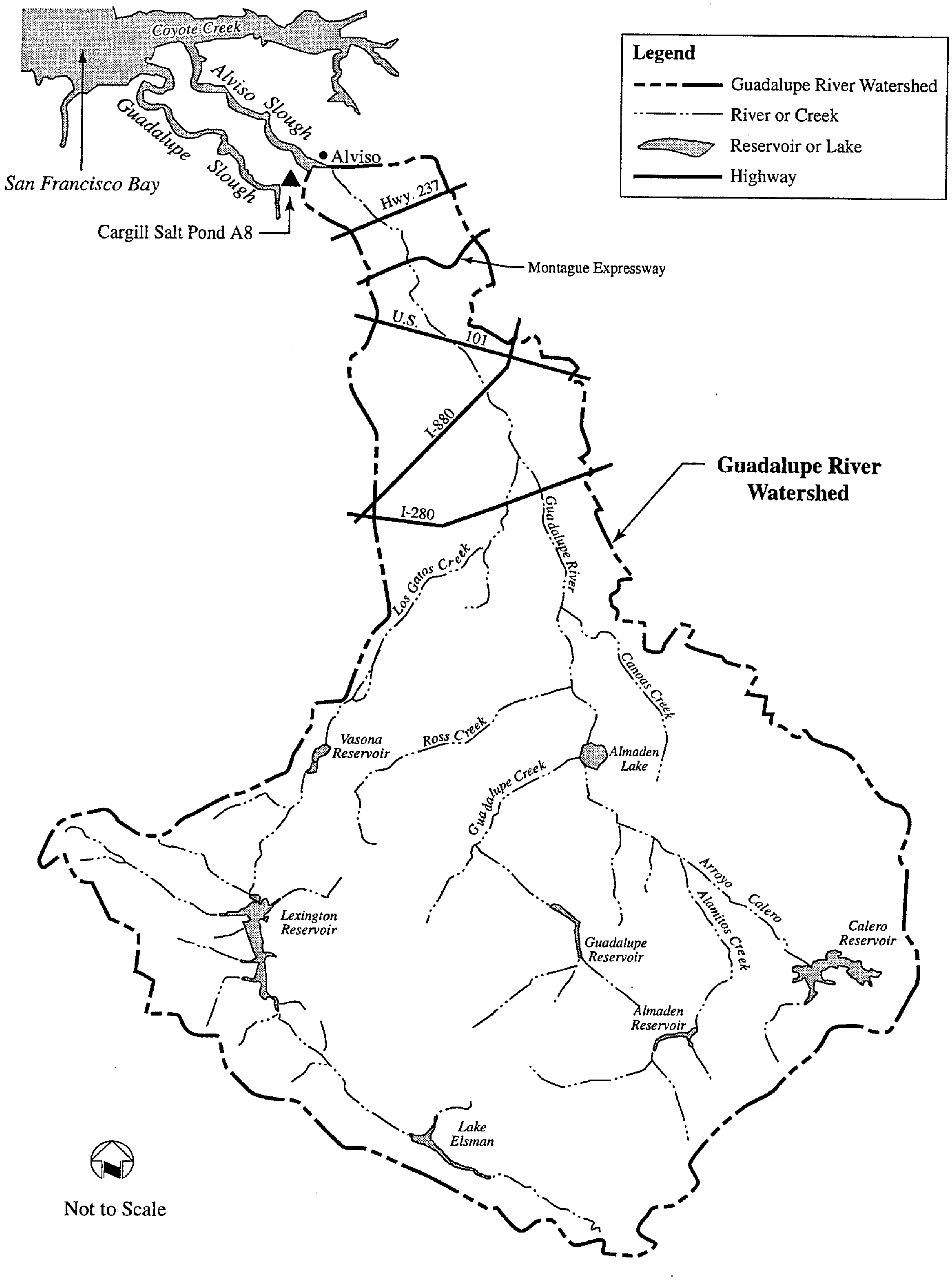


Figure 4.1-1. Guadalupe River Watershed

35,860 af. Although this storage capacity is primarily for water supply, there are some incidental flood protection benefits (Santa Clara Valley Water District, 1999).

Runoff and riverflow conditions have been greatly affected by reservoir operations and changes in land uses. Together, the reservoirs control or regulate runoff from an area of 63 square miles, which equals nearly 44 percent of the Guadalupe River basin above the downtown reach. About 56 percent of the Guadalupe River basin above the project area, or 81 square miles, is not controlled or regulated by the system of dams and reservoirs. Approximately 72 square miles of the basin downstream from the reservoirs is largely urbanized, with the river and its tributaries having been extensively channelized and levied for flood conveyance. The remaining 9 square miles, about 6 percent, of the basin not controlled by reservoirs consists of undeveloped lands in the Diablo Range and the foothills of the Santa Cruz Mountains.

4.1.1.2 Precipitation

The climate of the Santa Clara Valley is characterized by warm, dry summers and mild, moderately wet winters. Summer weather is dominated by sea breezes caused by differential heating between the interior valleys and the coast, while winter weather is dominated by storms from the northern Pacific Ocean that produce nearly all the annual rainfall.

Precipitation data are available from numerous rain gage stations in the Guadalupe River basin, some of which have been in operation for approximately 100 years. Records from precipitation gages located near Los Gatos (7.5 miles southwest of downtown San Jose), in San Jose, and at Santa Clara University (approximately 2.5 miles west of downtown San Jose) date back approximately 100 years. The average annual precipitation varies from less than 14 inches near San Francisco Bay and 14 inches in San Jose to over 44 inches near the crest of the Santa Cruz Mountains (Figure 4.1-2). The average annual precipitation for the Guadalupe River basin as a whole is about 20 inches. Ninety percent of the rainfall occurs in the late fall and winter months; January is usually the wettest month (Table 4.1-1).

4.1.1.3 Existing Runoff and Drainage

The average annual natural runoff past the Guadalupe River at San Jose gage for the period 1931-60 is estimated to be 35,500 af (U.S. Army Corps of Engineers, 1991b). Runoff during this period ranged from zero af in 1931 to more than 123,000 af in 1938, which is the wettest year on record (U.S. Geological Survey, 1999). Historically, the Guadalupe River has experienced significant flow fluctuations in response to the distinct wet and dry seasons. Virtually all surface runoff in the Guadalupe River basin occurs during the 5-month period from December through April (Table 4.1-2). The peak flow frequency curve for the Guadalupe River at San Jose gage near St. John Street Bridge is shown in Figure 4.1-3, and floodflow conditions are described in detail in Section 4.1.2, "Hydraulic Properties." Figure 4.1-3 shows the range of flows in the Guadalupe River and the frequency with which a given flow is exceeded.

TABLE 4.1-1. Monthly Average Precipitation for the Guadalupe River Basin
This table shows that January and December are normally the wettest months of the year in the Guadalupe River basin.

Month	Monthly Precipitation (Percent of Normal Annual Precipitation)
January	21.1
February	16.5
March	14.0
April	8.7
May	2.4
June	0.4
July	0.1
August	0.2
September	0.9
October	4.7
November	11.9
December	19.1

Source: U.S. Army Corps of Engineers, 1991b.

TABLE 4.1-2. Distribution of Monthly Natural Average Runoff for the Guadalupe River Basin
This table shows that nearly all the runoff in the Guadalupe River basin occurs from December through April.

Month	Monthly Natural Average Runoff (Percent of Normal Natural Annual Runoff)
January	19.8
February	32.6
March	20.5
April	10.9
May	0.3
June	0.0
July	0.0
August	0.0
September	0.0
October	0.0
November	1.0
December	14.9

Source: U.S. Army Corps of Engineers, 1991b.

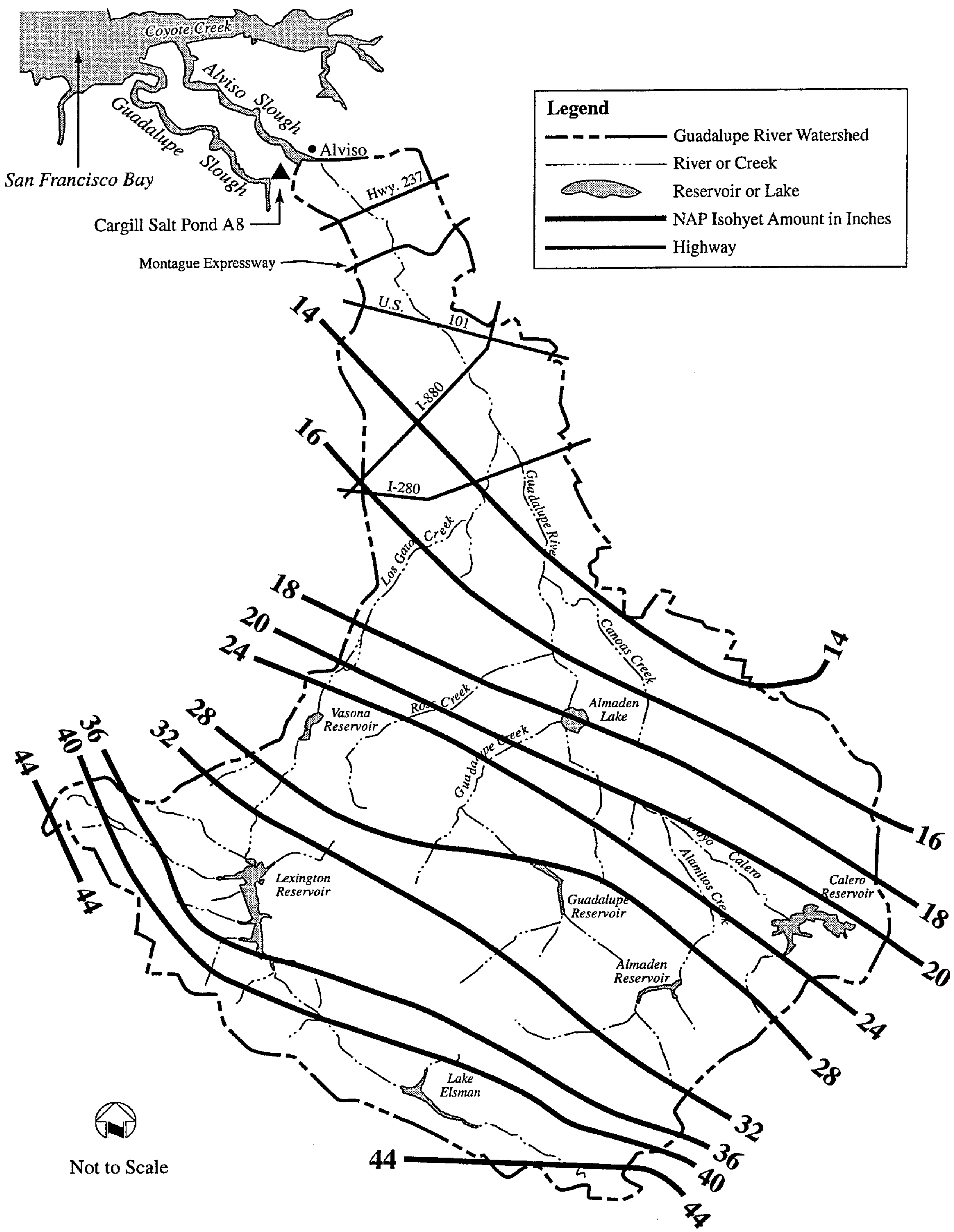
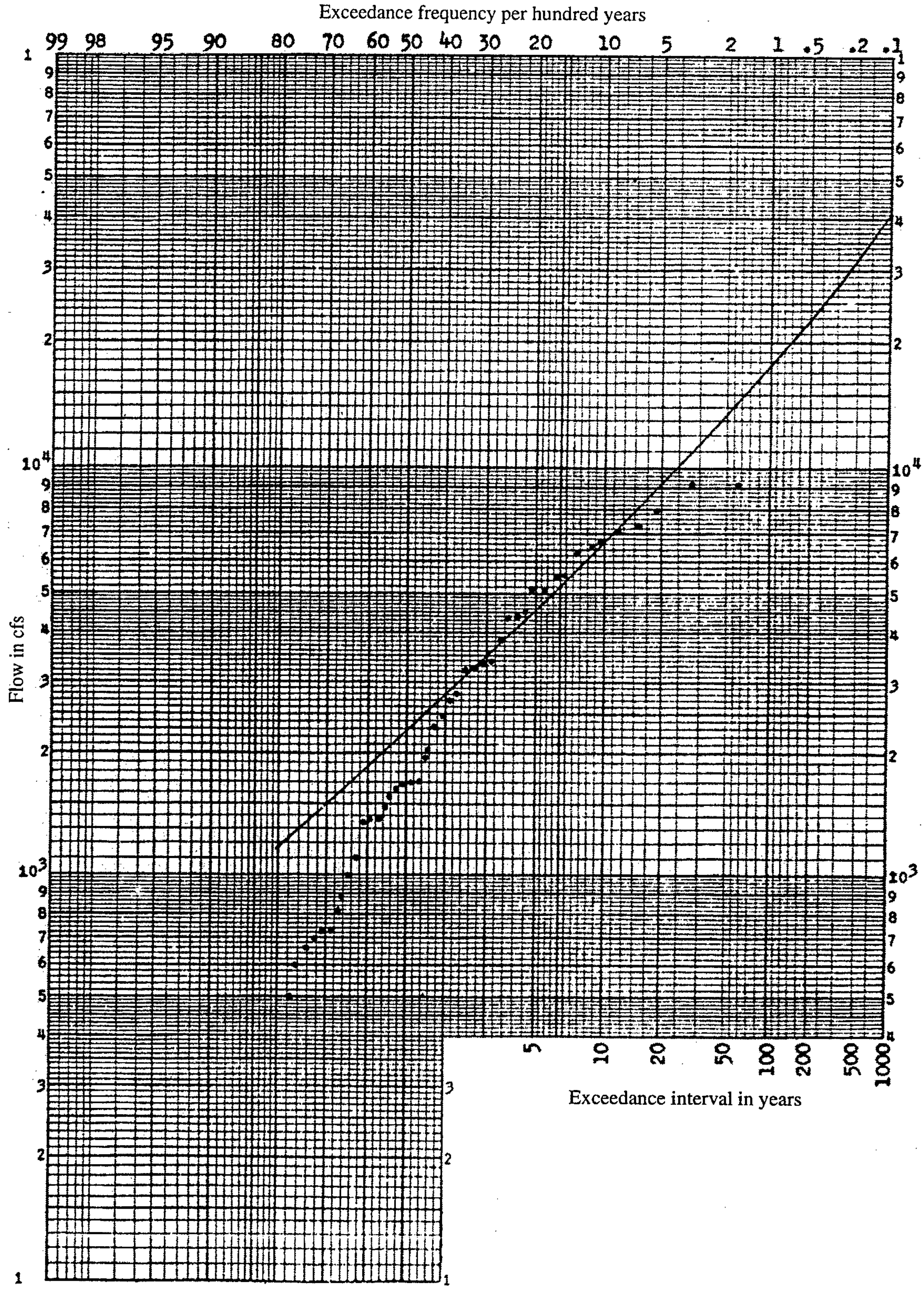


Figure 4.1-2. Normal Annual Precipitation Map



Period of record: 1930-1987
Drainage area: 144 Sq. Mi.

Source: U.S. Army Corps of Engineers 1991b.

Figure 4.1-3. Peak Flow Frequency Curve with the Expected Probability Adjustment

Low-flow conditions in the tributaries and main stem of the Guadalupe River have been modified by land use changes, imported water, reservoirs constructed in the upper portions of the basin, and hazardous materials cleanup programs upstream from the project area.

In general, urbanization and the associated increase in impervious surfaces in the form of residential, industrial, and commercial development tend to increase the rates and total quantities of runoff generated within the drainage basin. In the downtown area, where large office buildings have below-ground parking, intercepted groundwater is pumped and discharged to the river year-round. Summer irrigation from agricultural and residential water uses also increases summer flows.

Flows on the Guadalupe River have been altered since the late 1800s as a result of early agricultural development in the Santa Clara Valley (Hall, 1871). Flows were further altered after 1935, when Calero, Guadalupe, Almaden, and Vasona Reservoirs were completed near the river's headwaters and when Lexington Reservoir was completed in 1952. These reservoirs were designed to capture winter rains for groundwater recharge programs, but they are also operated to meet the instream flow requirements described in Section 4.1.2, "Hydraulic Properties." Generally these instream flow requirements are based on the needs of other water rights holders, such as water supply and agricultural users, as well as the needs of fish populations, recreation, and other public trust resources. Flow requirements are adjusted to take into account evaporation and channel losses.

Groundwater recharge ponds are located along the Guadalupe River approximately 4.5 miles upstream from I-280 (Segment 3C) and along Guadalupe Creek. Water is released from the reservoirs for diversion into the recharge ponds and to allow groundwater recharge through the streambeds. When the water released from the reservoirs exceeds the recharge capabilities of the recharge ponds and the streambeds, the surplus water flows down the Guadalupe River to the project area and beyond.

Flows in the Guadalupe River are also indirectly affected by water imported from the Sacramento-San Joaquin River Delta and the Coyote Creek basin. The imported water is delivered to the reservoirs or directly to the recharge ponds via the South Bay Aqueduct of the State Water Project (SWP), the San Felipe Division of the Central Valley Project (CVP), and Anderson Reservoir in the upper Coyote Creek basin.

SCVWD entered into a contract with the SWP in 1961 to deliver 100,000 af of water per year (Santa Clara Valley Water District, 1999). The first deliveries of SWP water were made in 1965. The amount of water delivered each year depends on the amount allocated by the California Department of Water Resources. The allocation is based on the water year type.

Construction of the San Felipe Division of the CVP was completed in 1979 for the purpose of delivering water and augmenting existing municipal water supplies for the San Francisco Bay region and surrounding areas. SCVWD began receiving San Felipe water in 1987 and has been receiving 50 to 75 percent of the annual CVP allotment of 152,000 af (U.S. Bureau of Reclamation, 1994). Because SWP and CVP water is diverted into the previously identified reservoirs or directly to the groundwater recharge basins, some surplus water may flow down the Guadalupe River to the project area (U.S. Army Corps of Engineers, 1991b). However, because SCVWD's operational goal is to release only the quantity of water that

can be effectively recharged, the effects on streamflow of importing up to 252,000 af of water are negligible downstream from the recharge ponds.

From 1983 through 1991, between 2,700 and 16,000 af of water per year were added to the Guadalupe River upstream from the project area. This water came from groundwater pumping conducted as part of a hazardous waste cleanup program at the IBM and Fairchild properties along Canoas Creek. Groundwater was pumped from contaminated areas, and the pollutants, consisting of various organic compounds, were mechanically removed from the recovered water. The water was then discharged to Canoas Creek. The hazardous waste cleanup program is nearing completion, and base flows in the river have returned to precleanup levels.

In summary, reservoir releases to satisfy the instream flow requirements, groundwater recharge pond capacities, and irrigation and drainage return flows have resulted in altered, and generally higher, flows during the summer months than historically experienced.

Table 4.1-3 shows the monthly distribution of mean daily flows at the USGS Guadalupe River at San Jose gage near the St. John Street Bridge for the period of record from water year 1954 through water year 1998. The median (50th percentile) daily streamflows in the low-flow months of May through October have been historically in the range of 1 cfs or less. This means that one-half of the mean daily flows between May and October have been less than 1 cfs and one-half have been greater than 1 cfs.

TABLE 4.1-3. Monthly Distribution of Mean Daily Flows [a] (cfs) in the Guadalupe River at the USGS Guadalupe River at San Jose Gage, Water Years 1954 through 1998
The median (50th percentile) daily streamflows in the low-flow months of May through October have historically been approximately 1 cfs or less.

Percentile[a]	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	1	0	0	0	0	0	0	0
30	0	0	0	2	3	2	1	0	0	0	0	0
40	0	1	1	4	6	5	3	1	0	0	0	0
50	1	2	4	8	15	16	5	2	1	1	1	0
60	2	4	8	18	25	31	15	3	2	2	1	1
70	4	8	16	28	61	74	23	6	4	3	2	2
80	8	19	25	82	173	157	54	19	12	10	8	8
90	17	36	73	310	230	409	184	27	21	17	19	17
100	2,460	1,140	4,490	4,460	6,632	7,870	5,150	972	206	104	160	276

[a] Percent of mean daily flows less than the indicated amount.

Source: U.S. Geological Survey, 1998.

4.1.1.4 Minimum Flow Releases

SCVWD does not have strict minimum flow release rates for the reservoirs in the Guadalupe River basin (Aguilera, pers. comm.). SCVWD's reservoir releases are, however, governed by water distribution and recharge capacities, allotments to downstream water rights holders, the requirement to maintain fish populations under Fish and Game Code Section 5937, and flood protection release rules. Because the purpose of the reservoirs is to store winter runoff to recharge the groundwater that provides potable water supplies to the Santa Clara Valley, SCVWD's operational goal is to release only water that can be used in its recharge operations or to meet the mandated flow requirements.

SCVWD is required to release all natural inflows to the reservoirs outside of their diversion periods to provide riparian water rights holders their water entitlement (Aguilera, pers. comm.). The periods when SCVWD is allowed to capture water in the reservoirs are as follows:

Almaden Reservoir	December 1 through April 30
Calero Reservoir	December 1 through April 30
Guadalupe Reservoir	December 1 through April 30
Lexington Reservoir	November 1 through May 15
Vasona Reservoir	December 1 through June 1

SCVWD is required by Section 5937 of the Fish and Game Code to maintain fish in "good" condition below its dams. To meet this requirement while also maximizing its groundwater recharge capabilities, SCVWD attempts to keep the creeks wet below the dams to at least the point where streamflows can be augmented by other sources. As a general guideline, this requires a minimum flow of approximately 3 cfs from Guadalupe Dam; approximately 2 cfs from Calero Dam; approximately 3 cfs from Almaden Dam; approximately 3 cfs from Lenihan Dam, which is the dam that creates Lexington Reservoir; and 8 to 10 cfs from Vasona Dam (Aguilera, pers. comm.). However, additional releases from either the reservoirs or the other sources are required to maintain flows in the creeks to their confluence with the Guadalupe River. For example, when releases from Calero Reservoir to Arroyo Calero are at the minimum level, SCVWD needs to augment the flow with increased releases from Almaden Reservoir to Alamitos Creek to maintain a flow below the confluence of these two streams that would reach the Guadalupe River. The minimum flows indicated previously would provide flow only to the confluence of the Alamitos Creek with Arroyo Calero; additional releases from either Calero or Almaden Reservoir would be required to maintain flows to the confluence with the Guadalupe River.

SCVWD also releases water from the reservoirs to prevent overtopping of the emergency spillways of the dams. Flood release operating rules, or curves, have been developed for each reservoir. Water is released from the reservoirs based on storage levels, rates of inflow, and weather forecasts to prevent uncontrolled spilling that could damage the dams. Although the flood release curves may provide some incidental flood protection to the valley floor, their primary purpose is to protect the safety of the dams. When the reservoirs are full, excess water is spilled to the Guadalupe River and its tributaries.

4.1.1.5 Historical and Recent Flooding

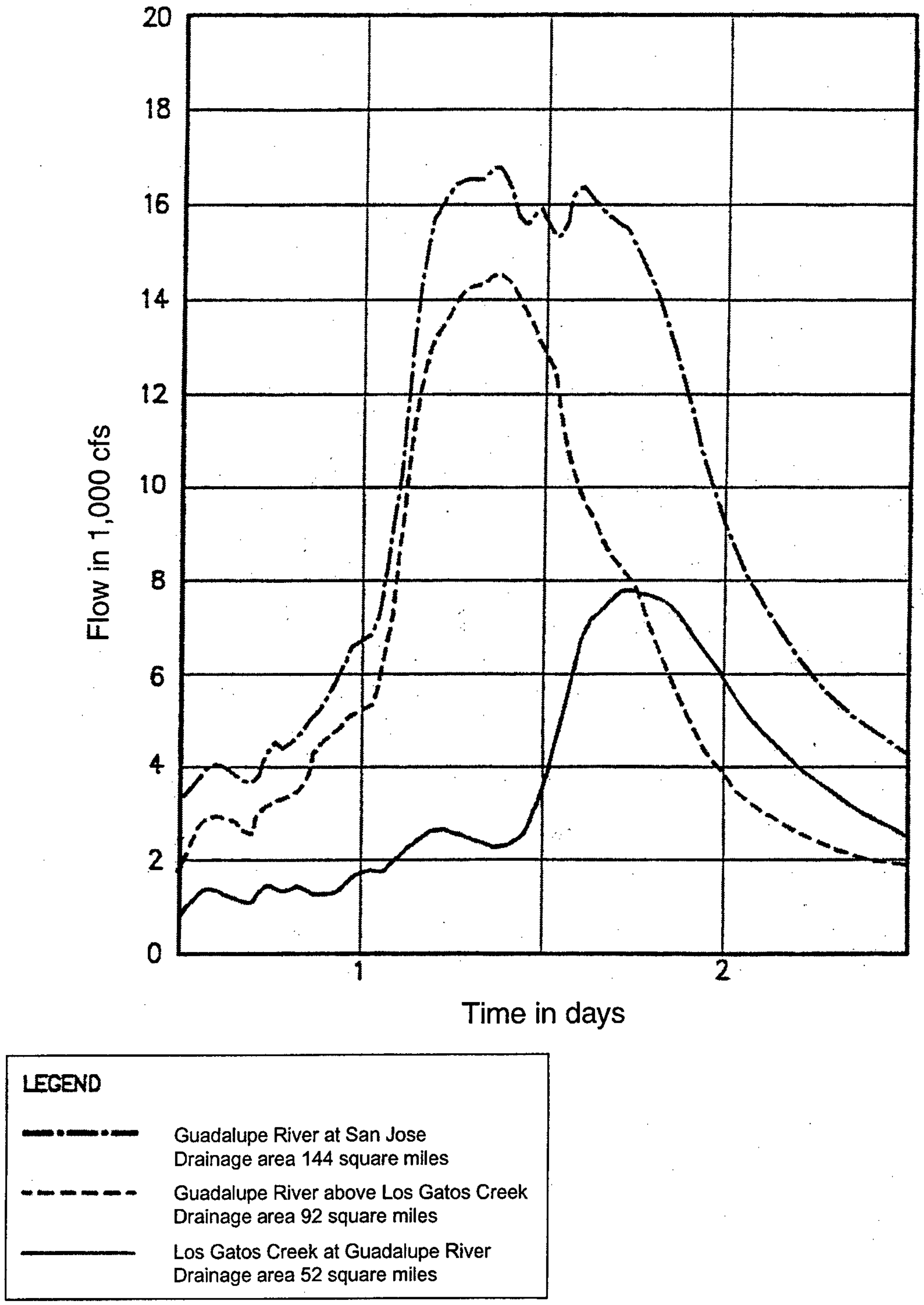
Historically, the Guadalupe River has frequently flooded. Flooding was recorded as early as 1889, and major flooding occurred in 1911, 1941, 1945, 1952, 1955, 1958, 1963, and 1967. The damage from flooding was most extensive in 1958, when the instantaneous peak flow reached 9,150 cfs. In 1963, voters passed a $12.75 million bond for flood protection in the North Central Flood Control Zone, which encompasses downtown San Jose (Santa Clara Valley Water District, 1999). Improvements funded by the bond consisted of channel modifications, bank and channel bed stabilization, and levee construction.

Since completion of the Corps' Hydrologic Study (U.S. Army Corps of Engineers, 1977), floods with peak floodflows that exceeded 6,000 cfs at the USGS Guadalupe River at San Jose gage near St. John Street Bridge have occurred in 1978, 1980, 1982, 1983, 1986, 1995, and 1997. There were two floods in 1982 and two in 1995. The 1986 flood peak value of 9,140 cfs nearly equaled the historic maximum reached in 1958. During the most recent floods in January and March of 1995, the Guadalupe River overtopped its banks in the neighborhoods between Glen Way and I-280. There was also significant flooding in the immediate vicinity of the Guadalupe River Project area downstream from I-280. Because the river overflowed its banks upstream from the San Jose gage, measured data of the maximum flows in Segments 3, 2, and 1 do not exist. However, based on high water marks and hydraulic modeling, the floodflows likely exceeded 11,000 cfs in January 1995. Based on Figure 4.1-3, the January 1995 flood has a recurrence interval of 25 years.

4.1.1.6 Calculation of the Design Flood

The 100-year design flood hydrograph for the Guadalupe River basin was based on hydrologic studies conducted by the Corps in the late 1970s (U.S. Army Corps of Engineers, 1977) and application of the U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC) flood hydrograph model, HEC-1 (U.S. Army Corps of Engineers, 1991b). This model calculates the basin response to a storm event and provides hydrographs for selected points in the basin. Precipitation data from the Los Gatos, San Jose, and Santa Clara University gages were used to develop the design storm precipitation distribution in the watershed for the model.

The peak 100-year design floodflow on the Guadalupe River immediately upstream from Los Gatos Creek in downtown San Jose has been calculated at 14,600 cfs (U.S. Army Corps of Engineers, 1991b). Based on the history of past reservoir operations, the HEC-1 modeling included the assumption that Almaden, Guadalupe, and Calero Reservoirs would be only partially full prior to the design storm and would provide some incidental flood protection (Figure 4.1-1). At the start of the design storm event, Lexington Reservoir was assumed to be about 10,000 af below gross pool storage, which is the storage capacity below the spillway. With this amount of storage available in the reservoir, flows in Los Gatos Creek at the Guadalupe River would peak at 7,800 cfs 6 hours after the peak on the Guadalupe River. The resulting design flood hydrograph has an instantaneous peak flow of 17,000 cfs, and flows exceeding 15,500 cfs through the project area would last nearly 12 hours (Figure 4.1-4). These flows represent only the volume of runoff generated during the storm event. They do not represent the flows that would actually be confined within the channels at these locations because the capacity of the channels is limited. Portions of the calculated peak flow would overtop the channel banks and cause flooding of the adjacent floodplains. Existing channel capacities are



Note: Flow in Guadalupe River at San Jose is representative of combined flows of the two individual flows in Guadalupe and Los Gatos Creek

Figure 4.1-4. Design Flood Hydrographs

described below in Section 4.1.2, "Hydraulic Properties." The HEC-1 model shows that the timing of the peak floodflows at the confluence of Guadalupe River and Los Gatos Creek is a function of the amount of storage space available in Lexington Reservoir on Los Gatos Creek.

In preparing the revised GDM for the Authorized Project (U.S. Army Corps of Engineers, 1991b), the Corps reviewed the design peak floodflows, taking into consideration the flooding and the land use changes that occurred since completion of the 1977 hydrology study. The Corps' 1991 analysis (U.S. Army Corps of Engineers, 1991b) concluded that the 1977 hydrology properly reflects future upstream channel improvements and urbanization. The Corps also determined that the flood routings and rainfall loss rates are still valid and properly reflect prevailing conditions. Consequently, the Corps has determined that the design floodflow of 17,000 cfs in the downtown reach accurately reflects the peak flow likely in the project area.

4.1.2 Hydraulic Properties

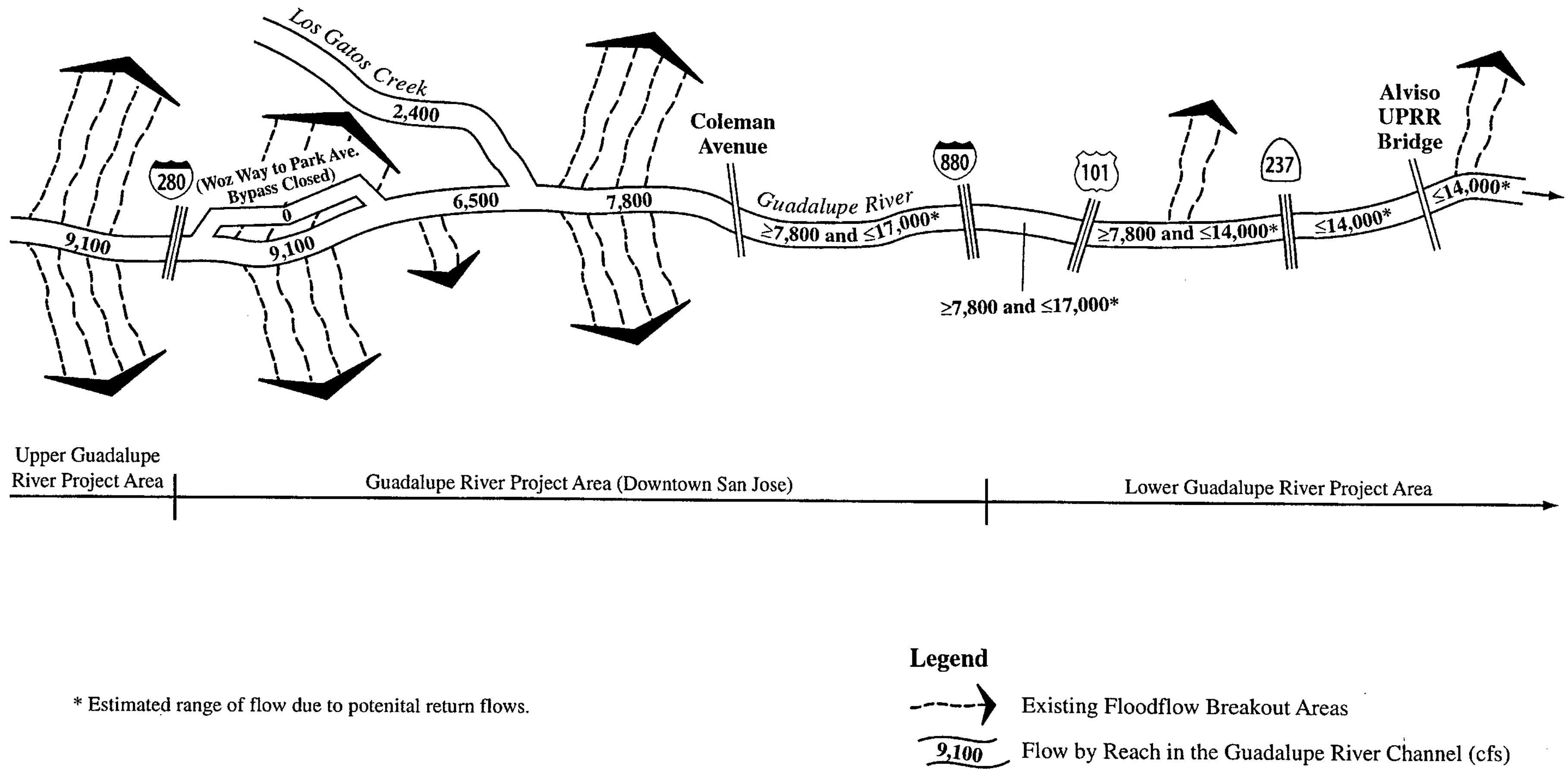
4.1.2.1 Channel Capacity

Figure 4.1-5 is a diagram of existing channel capacities; it shows areas where the channel would not currently be capable of conveying the design floodflow of 17,000 cfs. Existing bridges and the underground bypass at Woz Way are also shown. The capacity of the Woz Way to Park Avenue bypass reach is shown as zero because it is not currently operational. Areas that will not convey the design flows include the Guadalupe River from Grant Street downstream to Coleman Avenue (the upstream end of Segment 2) and downstream from Highway 101. The Project's flood protection components have been completed between Coleman Avenue and I-880 in Segments 1 and 2. Therefore, the total channel capacity through Segments 1 and 2 is now 17,000 cfs. However, the channel capacity in the Guadalupe River near St. John Street remains at 7,500 cfs. Flows greater than 7,500 cfs at St. John Street Bridge will continue to overtop the banks upstream from and in the vicinity of the bridge. Depending on where and when flows that overtop the banks return to the Guadalupe River, flows at I-880, under existing conditions, can be greater than 7,500 cfs. During the flood of 1995, flows at I-880 were estimated to have reached approximately 11,000 cfs.

In addition to the flood protection components of Segments 1 and 2, a narrow secondary channel was included in the constructed floodplain terrace adjacent to the river between Coleman Avenue and I-880. This secondary channel was included only to improve the wildlife habitat value of the riparian mitigation sites in the floodplain terrace. As described in Section 3.2, "Completed Components," water begins to flow into this channel when river flows are at approximately 500 cfs. When flows in the river reach approximately 1,000 cfs, approximately 200 cfs enters the secondary channel. Hydraulic properties of the secondary channel at specific flood events are not available.

4.1.2.2 Flow Velocity

The preproject hydraulic properties of the Guadalupe River were evaluated using the HEC-2 water-surface profile model (U.S. Army Corps of Engineers, 1991b). However, these 1991 data are not valid for describing the existing conditions because the flood protection components completed in Segments 1 and 2 have substantially altered the channel geometry. A model of existing conditions was developed using the HEC-RAS river analysis model to evaluate potential flood protection alternatives using the Corps' 100-year design



Source: 100-year design floodflow is based on U.S. Army Corps of Engineers (1993).

Figure 4.1-5. Existing Flows in the Guadalupe River at the Peak of the 100-Year Design Floodflow

Existing conditions include completion of Segments 1 and 2 and Segment 3C Phase 1. The Woz Way to Park Avenue Bypass is closed. Floodflows break out upstream and downstream from I-280, downstream from Los Gatos Creek, downstream from Highway 101, and downstream from the Alviso UPRR Bridge.

flood hydrograph (Figure 4.1-3) (Northwest Hydrologic Consultants, 1999). However, this model did not include river segments upstream from Park Avenue. Because the main purpose of the Northwest Hydrologic Consultants' analysis was to develop bypass alternatives for the Corps' 100-year design floodflow, detailed analyses were not completed for flows with more frequent recurrence intervals.

For the purposes of NEPA and CEQA analysis, preliminary estimates of the river's hydraulic properties were also made for the 2-year and 10-year flood events. Table 4.1-4 lists the hydraulic properties for selected cross-sections that are representative of hydraulic conditions that would be present in the downtown reach under the Corps' 2-, 10-, and 100-year flood conditions. The data are based on the assumption that all flow would be contained within a hypothetical channel that vertically extends the existing channel banks. The data indicate that the velocity and water-surface elevation increase with increases in flow.

The velocity data show that at some locations, the 2-year floodflows would result in higher velocities than the 10-year or 100-year design floodflows. This occurs primarily because of

TABLE 4.1-4. Representative Hydraulic Properties of the Guadalupe River under Existing Conditions
Velocity and depth generally increase with flow. Data presented are based on preliminary planning-level analysis.

Flood Event Interval (years)	Mean Channel Velocity (ft/sec)	Water Depth (feet)	Discharge (cfs)
Park Avenue to San Fernando Street			
2	5.22	3.6	1,725
10	4.56	10.5	5,025
100	5.81	19.9	14,600
San Fernando Street to Santa Clara Street			
2	3.52	5.8	1,725
10	3.95	12.8	5,025
100	5.92	21.6	14,600
Santa Clara Street to New Julian Street			
2	4.36	9.7	2,300
10	5.31	15.8	6,700
100	4.93	24.2	17,000
New Julian Street to Coleman Avenue			
2	4.18	10.9	2,300
10	5.11	17.7	6,700
100	5.72	25.9	17,000
Coleman Avenue to I-880			
2	5.55	8.8	2,300
10	6.08	12.6	6,700
100	5.12	18.3	17,000

Source: Elliott, pers. comm.

the channel cross-section geometry. Under higher flow conditions, the channel cross-sectional area is proportionally larger than under low-flow conditions. This condition is especially evident in the Coleman Avenue to I-880 reach, where high flows overtop the natural channel and are allowed to inundate a large floodplain terrace. The data show that under the 100-year design floodflow, the mean channel velocity would actually be lower than under the 2-year design flood. In addition, under high flow conditions, narrow portions of the channel, especially bridge crossings, cause the flood waters to back up, reducing the mean channel velocity upstream from the channel constriction. The data also show that under the 100-year design floodflow, the mean channel velocity is approximately the same at all of the representative cross-sections. Although there is local variation in velocity distributions across the channel, the mean channel velocity is ultimately controlled by the cross-sectional area of the channel and slope of the channel, which are relatively uniform throughout the project area (Section 4.2, "River Geomorphology").

4.2 River Geomorphology

4.2.1 Sediment Load

The processes of river geomorphology are basinwide. Therefore, sediment yield and sediment load have been considered for all areas of the basin. However, ongoing channel erosion and deposition and existing river morphology are discussed only for the project area.

A unified model for hydraulics and movable-bed sediment transport has not been developed for the entire Guadalupe River. Therefore, the precise locations and depths of erosion, deposition, and other site-specific geomorphic processes cannot be determined. However, general conclusions about larger areas can be made. The overall trend for sediment deposition or erosion, as well as the general assessment of river morphology, are presented for specific reaches in Segments 1, 2, and 3 and Reach A.

Sediment load is the total quantity of sediment derived from the land surface that reaches a river. Although flood protection projects in general do not affect sediment load, sediment load plays an important role in channel erosion and deposition and, ultimately, the morphology of the river. Sediment load is subdivided into two distinct components: bedload and wash load.

Bedload is made up of sediments greater than 0.0625 mm in diameter, which includes all materials coarser than fine sands. Bedload sediments may substantially affect the flood conveyance capacity of a channel. Because the coarse sediments that constitute bedload move down a river in pulses in response to the peak and duration of individual floodflows, bedload sediments may accumulate in some reaches of a river during small floods and be scoured away in large floods. They may also do the reverse: accumulate during large floods and be scoured away during small floods. Bedload sediments may accumulate for many years before a floodflow has enough energy to move the sediments; such a floodflow may be substantially larger than the design capacity of the channel. Therefore, these sediments must typically be removed to prevent flooding during smaller floodflows.

Wash load is made up of sediments less than 0.0625 mm in diameter, which includes silts, clays, and organic materials. Hydraulic modifications to the channel to accommodate

floodflows generally have no effect on the rates that wash load sediments are delivered to the mouth of a river or, in the case of the Guadalupe River, to San Francisco Bay, because of the very small size of these sediments.

Although the total drainage area for the Guadalupe River is approximately 160 square miles, approximately 44 percent of the drainage area is controlled by reservoirs located in the foothills of the Diablo Range and the Santa Cruz Mountains (Section 4.1.1.1, "Basin Physiography"). These reservoirs capture the sediment load from the upstream tributaries of the Guadalupe River. In addition, much of the valley floor is densely urbanized, which reduces the area of potential sediment production. Only 50 square miles of "effective drainage area" contribute to the sediment load in the Guadalupe River (U.S. Army Corps of Engineers, 1991b). Consequently, the sediment load delivered to the downtown reach is low because of the small size of the effective drainage area compared to the total drainage area.

USGS analyzed suspended sediment data from a small number of samples collected in the late 1950s and early 1960s at the Guadalupe River at San Jose gage near St. John Street (Table 4.2-1); the samples were analyzed for both bedload and wash load. The data indicate that the transport rates for suspended sediments are dependent on flow. The data also indicate that the proportion of silts and clays to sands is variable, although the silt and clay loads always constitute the largest proportion of the total suspended sediment. Because only a small amount of suspended sediment data are available from actual measurements in the Guadalupe River basin, the average annual sediment load of the Guadalupe River was estimated by using data from similar drainages in the region. (U.S. Army Corps of Engineers, 1991b).

Sediment yields from 10 drainage basins in Contra Costa and Santa Clara Counties were used to estimate the sediment yield from the Guadalupe River basin. Sediment yield is defined as the quantity of sediment a river delivers per unit area. These 10 drainage basins represent drainages similar to the Guadalupe River basin, and each has an effective drainage area of less than 50 square miles. The measured average annual sediment yield values for these basins ranged from 595 to 3,250 tons per square mile per year; the arithmetic average of these values is approximately 2,100 tons per square mile per year. The estimated average annual sediment yield values for these basins, which were calculated using five different computational methods, vary from 645 to 2,475 tons per square mile per year; the arithmetic average of the estimated values is 1,844 tons per square mile per year (U.S. Army Corps of Engineers, 1991b). Based on the measured and estimated data from the 10 basins, the average annual sediment yield to the Guadalupe River project area may vary from approximately 1,800 to 2,000 tons per square mile per year (U.S. Army Corps of Engineers, 1991b).

The average annual sediment load of the Guadalupe River, estimated using a sediment yield of 2,000 tons per square mile per year, is approximately 78,000 cubic yards, including approximately 13,500 cubic yards of bedload. Most of the wash load is assumed to be carried through the system under normal flow conditions. The annual delivery of wash load and bedload sediments to the downtown reach may vary considerably from year to year, depending on watershed conditions and the magnitude and frequency of single event floods.

TABLE 4.2-1. Suspended Sediment Load in the Guadalupe River Measured at USGS Guadalupe River at San Jose Gage
The suspended sediment transport rates are dependent on flow. Suspended sand is only a small proportion of the total suspended sediment.

Flow (cfs)	Total Suspended Sediment (tons/day)	Wash Load (less than 0.0625 mm) (tons/day)	Wash Load (less than 0.0625 mm) (percent)	Total Suspended Sand (tons/day)	Total Suspended Sand (percent)
13	70	60	86	10	14
77	761	647	85	114	15
84	130	100	77	30	23
88	113	84	74	29	26
97	149	140	94	9	6
272	1,620	1,490	92	130	8
344	947	551	61	396	39
465	1,260	1,084	86	176	14
481	1,870	1,571	84	299	16
548	1,370	942	68	428	32
587	1,500	1,080	72	420	18
620	4,150	2,531	61	1,618	39
675	10,900	7,521	69	3,379	31
1,450	16,200	11,016	68	5,184	32

Source: Hydrosphere Data Products, 1998.

In addition to the average annual sediment load estimated above, it is also important to estimate the sediment production and delivery from possible single flood events. These single flood events range from small flows with a 50 percent chance of occurring (2-year floodflow) to large flows with a 1 percent chance of occurring (100-year design floodflow). One or more substantial single flood events during the 100-year design life of the Guadalupe River Project could contribute substantial quantities of sediment that would have a substantial effect on the operation and maintenance of the project. Table 4.2-2 presents the sediment yield, bedload, and total sediment load delivered to the project area

TABLE 4.2-2. Single Flood Event Bedload, Total Sediment Load, and Sediment Yield
Larger flood events result in larger bedload, total sediment load, and sediment yield.

Flood Event (return interval)	Sediment Yield (tons/sq. mile)	Total Sediment Load (tons)	Bedload (tons)
Average annual	2,280	114,067	13,688
2-year	1,382	69,108	8,293
5-year	3,263	163,167	19,580
10-year	5,225	261,258	31,351
25-year	7,700	385,008	46,201
50-year	10,657	532,875	63,945
100-year	12,664	633,192	75,983

Source: U.S. Army Corps of Engineers, 1991b.

for single flood events with various flows. During the 100–year design floodflow, the estimated sediment delivery to the project area is approximately 633,000 tons (486,900 cubic yards). Of this total load, approximately 76,000 tons (59,200 cubic yards) consists of bedload.

4.2.2 Channel Erosion and Deposition

Channel erosion and deposition are natural processes needed to maintain a healthy riverine environment. However, too much erosion may undermine infrastructure, reduce bank stability, and erode spawning gravels. Too much sedimentation may reduce the flood protection values of the channel, fill pools, smother invertebrates, and fill the pore spaces in spawning gravels. Channel erosion and deposition can affect the stability of a river's bed and banks. This stability in turn can affect SRA cover vegetation, in-stream cover, substrate composition, and other components of habitat for aquatic species. Excessive channel erosion and deposition usually occur in specific locations where the uniform transport of the sediment load is disturbed by changes in the cross-sectional area of the channel or slope of the channel. To identify potential areas in the Guadalupe River where excessive erosion or deposition would occur, the Corps completed a sediment transport continuity study for portions of the downtown reach (U.S. Army Corps of Engineers, 1991b). Table 4.2-3 presents the results of the sediment transport continuity study. Sediment transport continuity data are not available for Segment 3C. Segment 3C is the bedload supply reach used in the sediment transport model (U.S. Army Corps of Engineers, 1991b). The sediment load delivered from Segment 3C is presented in Table 4.2-2. The study indicated that for existing average annual conditions, the downtown reach is slightly sediment-starved or eroding and that a total of approximately 6,157 tons (4,735 cubic yards) of bed material could be scoured from the downtown reach annually.

During the 100-year design floodflow, the downtown reach has the potential for approximately 3 feet of erosion (U.S. Army Corps of Engineers, 1991b). The table also shows that under all flow conditions, the downtown reach has a net deficit of sediment. Although sediment may accumulate in certain areas (for example, downstream from bridges), localized areas of erosion may also occur that cumulatively result in a net sediment deficit.

Although the sediment transport continuity study shows that the downtown reach is sediment-starved under existing conditions and has the potential to erode, the bed and bank materials are resistant to erosion. Most of the project area appears to be underlain by estuarine bay muds (U.S. Army Corps of Engineers, 1991b). These estuarine muds are stiff clay and silt deposits that are much more resistant to erosion than the few inches of sands and gravels that lie on the surface of the riverbed. The sands and gravels that overlay the riverbed are much younger than the estuarine muds and are fairly well graded, noncohesive fluvial deposits ranging from very fine sands (0.1 mm) to large cobbles (150 to 250 mm). Of the fluvial deposits in the downtown reach, 35 percent are less than 5.7 mm in diameter, 50 percent are less than 10 mm in diameter, and 90 percent are less than 35 mm in diameter (Northwest Hydrologic Consultants, 1999). These fluvial deposits migrate into and along the riverbed during floodflows. During most small to medium flood (2- to 10-year) events, coarse-grained sediments in the riverbed are not readily transported and thus act to naturally armor the bed and control some of the bed erosion. The underlying erosion-resistant estuarine bay muds control bed erosion even if flows are high enough to mobilize

the noncohesive fluvial deposits of sands and gravels in the riverbed (U.S. Army Corps of Engineers, 1991b).

The top-of-channel bank materials are composed of silty clays, clayey silts, and silty sands of the Sunnyvale-Castro-Clear Lake Association (Soil Conservation Service, 1968). The underlying bank materials consist primarily of very fine and fine sands contained in a cohesive silt and clay matrix. The substantial amount of fines provides vertical stability to the bank and moderate to high resistance to erosion. Although there are some bank locations that were substantially eroded during the 1995 and 1997 floods, the channel banks are relatively stable. If the bank materials were less cohesive and less resistant to erosion, the banks would not be as steep, the channel would not be as deeply incised, and the channel would be much wider.

TABLE 4.2-3. Sediment Transport Continuity

The sediment transport continuity at several locations within the downtown reach prior to implementation of the Authorized Project indicates that the larger the flood event, the larger the change in bedload and potential depth of erosion.

Flood Event (return interval)	Change in Bedload (tons)	Potential Depth of Erosion (feet)
Segment 3B: Santa Clara Street to New Julian Street		
Average annual	-3,935	.57
2-year	-3,145	.45
5-year	-4,745	.68
10-year	-6,855	.99
25-year	-14,170	2.04
50-year	-19,035	2.74
100-year	-21,829	3.14
Segment 3A: New Julian Street to Coleman Avenue		
Average annual	-2,222	.20
2-year	-258	.02
5-year	-2,431	.22
10-year	-5,599	.51
25-year	-11,680	1.07
50-year	-19,467	1.79
100-year	-28,357	2.60
Segments 1 and 2: Coleman Avenue to I-880		
Average annual	-11,531	.53
2-year	-6,765	.31
5-year	-15,434	.71
10-year	-25,170	1.16
25-year	-41,167	1.90
50-year	-59,519	2.74
100-year	-78,999	3.64

Source: U.S. Army Corps of Engineers, 1991b.

Although the channel has formed in relatively erosion-resistant riverbed and bank materials, there is evidence of active channel erosion. The USGS weir near St. John Street Bridge and the gas and sewer lines that cross the river near Old Julian Street Bridge have been exposed and undermined. These exposed utility lines are 3 to 4 feet in diameter and were originally installed several feet below the riverbed, indicating that the riverbed in Segments 3A and 3B may have eroded 6 or more feet since the lines were installed in the 1930s. Recent bank and bed erosion in Segment 3C both upstream and downstream from Woz Way is evident from the exposed bridge piling caps at the State Route 87 and I-280 crossings. These erosional features are also evident in recent cross-section surveys completed for Segment 3C as well as areas immediately upstream and downstream from Segment 3C (Northwest Hydrologic Consultants, 1999).

4.2.3 River Morphology

Prior to human influence, floodwaters in the Guadalupe River system were allowed to overflow the streambanks and spread out onto a broad natural floodplain, dropping much of their sediment load onto the floodplain. Currently, the Guadalupe River is a managed floodway. The natural river channel in the project area has been straightened, confined, and armored, giving it a relatively simple and uniform cross-sectional geometry that is narrower and deeper than the original natural stream condition. High flows are now confined to a narrow, steep channel system that allows little opportunity for floodwaters to spread onto the floodplain. The water supply reservoirs trap a large proportion of the sediments from the upper watershed. These changes have increased the flood conveyance capacity of the river but have reduced its potential to accumulate and temporarily store sediment on the remaining floodplain and in-channel bars and has contributed to downcutting of the channel and the erosion identified in Section 4.2.2, "Channel Erosion and Deposition." To prevent future channel erosion, armoring was placed at the Coleman Avenue and at the I-880 bridge crossings as part of past Authorized Project features constructed in Segments 1 and 2. Existing instream features such as bridge piers, water gaging weirs, and exposed utility infrastructure create localized morphologic features. These existing morphologic features include gravel beds, plunge pools, scour holes, and shallow braided channels. Although these features are localized, they may be substantially impeding anadromous fishes (Section 4.6.3.3, "River Morphology"). The 305 lf of bed armoring at Coleman Avenue and 448 lf at I-880 contain low-flow channels designed to allow for fish passage.

The morphology (channel form and processes) of the Guadalupe River can be divided into two distinct reaches: tidal and nontidal. The tidal reach extends from San Francisco Bay to Montague Expressway, which is the upstream tidal limit. The nontidal reach consists of a steeper channel slope with higher energy conditions, characterized by gravel-sized bed material in the low-flow channel, gravel-bars, and occasional steep, eroded banks. The nontidal reach, which includes the project area, extends upstream from Montague Expressway to the Almaden drop structure. A primary difference between the two reaches results from a change in elevation and slope at Montague Expressway. As the Guadalupe River enters the tidal reach, where its elevation is within the zone of influence of San Francisco Bay tides, its slope abruptly lessens, causing a decrease in sediment transport capacity that results in significant sand and gravel deposition near Trimble Road (approximately 4 miles downstream from I-880). The channel slope of the tidal reach continues to lessen with distance downstream.

The existing channel form includes riffles, runs, and pools. Riffles are characterized by shallow, fast flow with surface turbulence. Runs are similar to riffles but are usually deeper and lack surface turbulence. Pools are characterized by relatively deep, slow flow and generally retain water when streamflow approaches zero. Pools separated by short runs and riffles characterize the downtown reach. The USFWS HEP analysis that was prepared for the Authorized Project indicates that pools constitute 30 to 70 percent of the downtown reach (U.S. Fish and Wildlife Service, 1984). USFWS was contacted to determine if detailed mapping of pools, runs, and riffles was available for the Guadalupe River Project area; however, these specific features had been mapped for only 15 transects in Segment 1. In these transects, the percentage of pools ranged from 0 to 100 percent, with an average of 70 percent (Schoenberg, pers. comm.). In the HEP analyses to evaluate SRA effects (U.S. Army Corps of Engineers, 2000c), it was assumed that Segments 2 and 3 had a pool percentage of 35 to 60 percent (Schoenberg, pers. comm.). However, Mr. Schoenberg believes from his personal experience that Segments 3A and 3B consists of 60 to 80 percent pools separated by short riffles. Stream surveys conducted in 1986 and 1987 indicate that riffles constitute less than 10 percent of the downtown reach (The Habitat Restoration Group, 1991, Section 4.6.3.3). Channel maintenance flows and gravel-flushing flows are necessary to maintain channel form and gravel quality (Milhous and Bovee, 1977, Rosgen et al., 1986). Changes in sediment transport rates or flow can result in changes in channel form and loss of spawning and cover habitat for fish (Milhous and Bovee, 1977). Increases in the width-to-depth ratio of stream channels can degrade fish habitat, such as spawning habitat, and create passage problems for migrating species, such as steelhead and chinook salmon. Substantial reductions in peak flows can also cause sedimentation problems because the size of the bedload material that can be transported through the system is reduced as the flow is reduced. The deposition of fine sediments, such as sand-, silt-, and clay-sized particles, can adversely affect spawning, egg survival, fry emergence, and food production by filling in the pore spaces in cobble and gravel beds.

Channel maintenance flows are defined as the flow that just fills a nonincised channel to flood stage. Maintenance flows determine the channel form and are responsible for transporting the largest proportion of the bedload over the long term (Rosgen et al., 1986). The 1.5-year recurrence interval flow is considered the channel maintenance flow for this analysis (Dunne and Leopold, 1978, Rosgen et al., 1986). Based on the most recent hydrologic data from the USGS Guadalupe River at San Jose gage, the 1.5-year recurrence interval flow in the Guadalupe River is estimated to be approximately 1,200 cfs. This flow, which was calculated from the historical annual-maximum flood series, reflects the effects of urbanization and reservoir operation on the hydrologic conditions of the Guadalupe River. Ongoing physical and mathematical hydraulic modeling will determine the exact channel maintenance flow.

4.3 Water Quality

The study area for the evaluation of water quality issues is the same as the project area. However, water quality in a given area of a flowing stream section is largely influenced by processes and activities that occur in upstream areas of the drainage basin or watershed. In a natural system, surface water quality depends primarily on the mineral composition of the rocks in the upper source areas of the stream. Farther downstream, the water quality is

influenced by the mineral characteristics of the materials through which it flows and by contributions from tributaries. In an urban or developed system, water quality is also affected by discharges from point and nonpoint sources.

The San Francisco Bay RWQCB has primary authority for ensuring that water resources are protected from degradation by pollutant discharges. Beneficial uses of the major rivers and groundwater basins, along with narrative and numerical water quality objectives, are established in the water quality control plan (Basin Plan) for the region (San Francisco Bay Regional Water Quality Control Board, 1995). Existing beneficial uses of the Guadalupe River are noncontact water recreation, warm freshwater habitat, and wildlife habitat. The Basin Plan also identifies several potentially beneficial uses, including fish migration, contact water recreation, and fish spawning habitat. The Basin Plan is periodically reviewed and updated pursuant to the Porter-Cologne Water Quality Control Act of 1975. The EPA has also promulgated freshwater and saltwater criteria for 126 priority pollutants (13 heavy metals, asbestos, and 112 organic compounds) in the National Toxics Rule. The State of California is currently developing the California Toxics Rule that would promulgate new water quality criteria for the priority pollutants and supersede the National Toxics Rule in California.

The San Francisco Bay RWQCB is required to identify water bodies that do not meet water quality objectives pursuant to Section 303(d) of the CWA. Table 4.3-1 lists waters in the Guadalupe River watershed that have been designated as impaired and the pollutant for which they were designated. The table also shows pollutants in South San Francisco Bay that contribute to the river's designation as an impaired water body. The designation as impaired can be the result of pollutants, such as heavy metals or pesticides, or a physical property of the water, such as dissolved oxygen or temperature. Section 303(d) also requires

TABLE 4.3-1. Waters in Guadalupe River Watershed Listed as Impaired by RWQCB under Section 303 (d) of the CWA

Water Body/Water Way	Listed Impairment (Pollutant)
Calero Reservoir	Mercury
Guadalupe Reservoir	Mercury
Alamitos Creek	Mercury
Guadalupe Creek	Mercury
Guadalupe River	Mercury
Guadalupe River	Diazinon
San Francisco Bay, South	Diazinon
San Francisco Bay, South	Copper
San Francisco Bay, South	Mercury
San Francisco Bay, South	Nickel
San Francisco Bay, South	Selenium
San Francisco Bay, South	PCBs
San Francisco Bay, South	Chlordane
San Francisco Bay, South	Dieldrin
San Francisco Bay, South	Exotic Species

Source: State Water Resources Control Board, 1999.

preparation of TMDL programs for impaired waters identified by the State. A TMDL quantitatively establishes the amount of pollutant allowable in a water body and specifies an allowable load of the pollutant from individual sources that can be discharged in compliance with water-quality standards. TMDL programs for impaired waters in the Guadalupe River watershed are in various stages of development. Mercury contamination is considered a regional problem in the upper Guadalupe River watershed that results from past mining activities for cinnabar, a mercury-containing ore. As described in Section 1.5.3, "Regional and Local Requirements," the San Francisco Bay RWQCB recently released a public draft TMDL and implementation plan for mercury covering the entire San Francisco Bay region (Regional Water Quality Control Board, 2000).

In 1990, EPA issued regulations concerning applications by municipalities for NPDES permits covering municipal stormwater. EPA has delegated to SWRCB and local RWQCDs the authority to issue and enforce these permits. The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPP) was implemented to address NPDES permit application requirements. The SCVURPP is a coalition of 15 local agencies that work together to help prevent pollution in urban runoff from reaching Santa Clara Valley creeks or San Francisco Bay. Water pollution that is produced from widespread sources or large land areas and that has no single location of discharge to the stream is called nonpoint source pollution. Nonpoint source pollutants can enter a stream through urban runoff, groundwater discharge to the stream, and atmospheric deposition. In and upstream from the project area, almost all surface-water contamination results from nonpoint source runoff. There are no well-defined point sources of pollutants, such as wastewater treatment plant discharges, that discharge into the Guadalupe River watershed. However, there are storm drains that convey nonpoint source runoff to the Guadalupe River within well-defined outlet structures. In general, nonpoint source pollutants include inorganic chemicals (salts, metals, and biostimulatory nutrients, such as nitrogen and phosphorus), suspended solids, pesticides, bacteria, and oil and grease that accumulate on the land surface. During dry periods, these accumulated pollutants can be lifted from the land surface and transported by wind. At the beginning of the rainy season, the accumulated pollutants are washed off land and other surfaces, or they can percolate through the soil to the groundwater and be conveyed to streams.

USGS compiled water quality data for the Guadalupe River intermittently from 1949 through 1994 from samples collected on 36 separate occasions (Table 1H-1 in Appendix 1H). The samples were collected immediately downstream from the confluence of the Guadalupe River with Los Gatos Creek. The samples were analyzed for a broad range of physical and chemical constituents of concern. Parameters measured included flow, temperature, dissolved oxygen, pH, hardness, turbidity, nutrients (nitrogen and phosphorus), and trace metals. A review of the data indicates that Guadalupe River water is relatively hard. The majority of low-flow summer hardness concentrations are greater than 300 milligrams per liter (mg/L), which is indicative of high inorganic mineral content (Table 1H-1 in Appendix 1H). The pH levels, which indicate the balance of acids and bases, generally range from 7.5 to 8.0, or slightly above neutral.

4.3.1 Suspended Solids and Biostimulatory Nutrients

Suspended solids are generated when dry soils are disturbed and discharged directly to a water body or carried to the receiving water in overland runoff. High concentrations of suspended solids in streams cause many adverse consequences, including increased turbidity, reduced light penetration, reduced ability of sight-feeding predators to capture prey, clogging of gills of fish and aquatic invertebrates, reduced spawning, reduced survival of juvenile fish, and reduced angling success. Additional impacts, such as smothering of the benthic community and changes in the composition of the bed substrate, result when the sediment is deposited in slow-moving receiving waters. Sediment is also an efficient carrier of toxic organic substances and trace metals. Once deposited, pollutants in these enriched sediments can be remobilized under suitable environmental conditions and pose a risk to benthic life (Gavin and Moore, 1982). USGS measurements indicate that turbidity in the Guadalupe River fluctuates, with higher levels during the winter and much lower levels during summer low-flow conditions (Table 1H-1 in Appendix 1H).

Soil and sediment typically contain large amounts of nutrients, particularly phosphorus, that can stimulate the growth of plants and algae. Excessive growth of plants and algae can reduce the aesthetic appeal of the water for recreational users, clog the habitat used by other aquatic organisms, and cause other nuisance conditions. Excess levels of phosphorus and nitrogen in urban runoff can lead to undesirable algal blooms in downstream receiving waters, a process that is known as eutrophication. Generally, phosphorus is the controlling nutrient in freshwater systems. Bioassays (Occoquan Watershed Monitoring Laboratory, 1983) have indicated that the typical nutrient concentrations in urban runoff are more than sufficient to stimulate excessive algal growth. A major reason is that a majority of the nutrients in urban runoff are present in soluble forms that are readily used by algae. High nutrient levels also promote the growth of dense mats of green algae that attach to rocks and cobbles in shallow, unshaded streams. Finally, nutrient loads can contribute to eutrophication in both fresh and tidal waters. Nutrient export is generally greatest from urban developed sites that have large areas of impervious surfaces. However, nutrient export is sometimes greatest from land uses that receive unusually high applications of fertilizers, such as golf courses, cemeteries, and other intensively managed areas.

USGS measurements in the Guadalupe River for turbidity ranges from 1.5 to 800 nepholometric turbidity units (NTU) with an average of 99 NTU. During the summer when streamflow is low, turbidity ranges from 1.5 to 44 NTU. Concentrations of turbidity and nutrients are highest during the winter months when rainfall provides the majority of runoff (Table 1H-1 in Appendix 1H). The USGS data also indicate moderate levels of nutrients, which range from 0.05 to 0.25 mg/L for phosphorus and 1 to 3 mg/L for nitrogen. The measured nutrient levels are not considered excessive and are not expected to lead to extensive nuisance algal growth. There are no data from the Guadalupe River for algal growth or associated chlorophyll levels; therefore, the extent of eutropic conditions cannot be fully evaluated. The presence of creeping macrophytes such as water primrose (Section 4.4, "Biological Resources – Vegetation") is an indication of the eutropic conditions.

4.3.2 Toxic Constituents

A number of studies have been conducted locally and nationally to characterize toxic constituents in urban runoff. As defined by EPA, priority pollutants are pollutants that are

suspected or known to represent risks to human health. In a national study, heavy metals were observed to be the most prevalent priority pollutants found in urban runoff, with concentrations far exceeding those of organic compounds (Environmental Protection Agency, 1983). In many cases, heavy metal concentrations at NURP sampling sites were found to exceed EPA ambient water-quality criteria and drinking water standards. A majority of the trace metals measured in water samples are attached to sediment, which effectively reduces the level of trace metals immediately available for biological uptake and subsequent bioaccumulation. Metals associated with sediment rapidly settle out of the water column and accumulate in soils and aquatic sediments (Occoquan Watershed Monitoring Laboratory, 1983, Gavin and Moore, 1982).

Urban runoff may contain petroleum hydrocarbons from leakage of automotive oils and greases. Petroleum hydrocarbons are a concern because of their potential toxicity to aquatic organisms at low concentrations (Tanacredi and Stainken, 1981, Stenstrom et al., 1984). As might be expected, petroleum hydrocarbon levels are highest in the runoff from parking lots, roads, and gasoline stations. Residential land uses generate less hydrocarbon export, although illegal disposal of waste oil into storm sewers can be a local problem. There is no routine monitoring of petroleum hydrocarbons in the Guadalupe River; however, some generalizations can be made regarding the likely presence of these constituents in runoff from the highly urbanized areas in and surrounding San Jose. Numerous studies performed throughout the United States (Schuler, 1986) have reported average hydrocarbon levels during storms ranging from 2 to 10 mg/L. Hydrocarbons are lighter than water and are initially found in the form of a rainbow-colored film on the water's surface. However, hydrocarbons have a strong affinity for sediment, and much of the hydrocarbon load eventually adsorbs to sediment particles and settles out of the water column. Hydrocarbons tend to accumulate rapidly in the bottom sediments of lakes and estuaries (Wakeham, 1977, Tanacredi and Stainken, 1981), where they may persist for long periods and exert adverse impacts on benthic organisms (Whipple and Hunter, 1979).

SCVURPP conducted a regional stormwater pollutant loads assessment to identify pollutants of concern entering South San Francisco Bay from adjacent land areas, their sources, and measures needed to control these pollutants (Woodward Clyde Consultants, 1991). Pollutant load refers to the total mass of pollutant transported in surface runoff and streamflow. The SCVURPP study showed that constituents of urban runoff vary considerably within and between storm events and from site to site. Table 4.3-2 shows the mean annual pollutant loads for the Guadalupe River and Los Gatos Creek and the total load contributed to San Francisco Bay. The Guadalupe River basin contributes approximately one-third of the pollutant load in San Francisco Bay that originates from the South Bay area. The data also indicate that the pollutant load is greater from residential land uses than either industrial or open space land use categories. The data indicate that mercury, lead, copper, and zinc are present at detectable levels in the Guadalupe River.

Table 1H1 in Appendix 1H indicates that concentrations of metals detected in USGS samples are generally well below National Toxics Rule criteria. However, samples occasionally exceeded criteria for chromium, copper, lead, nickel, and zinc. The detection limits used for analysis of cadmium and lead in some of the samples were higher than the National Toxics Rule criteria; comparison to the National Toxics Rule criteria is, therefore, not possible.

Mines such as the New Almaden Mine, which operated for many years in the upper watershed, are known to be a source of the mercury in the Guadalupe River watershed. Leaching of mine tailings and overland flow of mercury-rich soils have resulted in the downstream accumulation of mercury in the Guadalupe River watershed. The mercury problem is, in large part, a legacy of the California gold mining era because mercury was used to extract gold. Figure 4.3-1 identifies the locations of mines in the watershed, the largest of which are the mines in the New Almaden Mining District. The New Almaden Mining District is located on lands that are now part of the approximately 4,000-acre Almaden Quicksilver County Park, which is owned by the Santa Clara Parks and Recreation Department. Additional mines include the Guadalupe Mines adjacent to Guadalupe Creek at the Guadalupe Landfill. As a result of this intensive mining, tributaries of the Guadalupe River, including Guadalupe Creek and Alamitos Creek, as well as the Guadalupe River itself, have been contaminated with mercury. Large quantities of mercury exist within the river-bottom sediments and riverbank soils of these waterways as a product of mercury extraction in the watershed.

A number of complex physical and chemical factors affect the solubility of mercury in water and its availability for uptake in aquatic organisms. Although mercury is primarily found in a sediment-bound form, sediment-bound mercury may still be available to aquatic organisms and thus remains a pollutant of concern. The greatest concern with regard to the accumulation of mercury-laden sediments in the watershed is the potential for sediment-bound mercury to transform to dissolved and methylated forms that can be readily adsorbed by aquatic organisms (plant uptake is considered insignificant). The solubility of mercury in fresh water is affected by a number of chemical and physical factors, but is generally low. Factors conducive to methylation of mercury include low-flow or stagnant waters, hypoxic or anoxic conditions in the water column, low pH (< 6), and high concentrations of dissolved carbon. Most of these factors are in turn affected by biological processes such as metabolism, growth, and decay. Because methylation is affected by biological processes, it is likely that the rate and quantity of methyl mercury formation changes seasonally.

Samples of river-bottom sediments and bank soils were collected along Reach 3 of the Guadalupe River several times between 1991 and 1993 and analyzed for total recoverable mercury wet weight (CH2M HILL, 1995, CH2M HILL, 1994). River-bottom sediment results ranged from 0.05 (method detection limit) to 49 mg/kg, with a mean of 4.2 mg/kg and standard deviation of 7.8 (total of 40 samples). Results for riverbank soils ranged from 0.14 to 5.2 mg/kg, with a mean of 1.7 mg/kg and a standard deviation of 1.4 (total of 34 samples). More recent sampling on the Guadalupe River between Highway 237 and Blossom Hill Road (below Almaden Expressway) documented mercury concentrations ranging from 0.05 to 0.46 mg/kg in a suite of 10 samples (Tetra Tech, 2000).

In June 2000, bank samples were collected on Guadalupe Creek between Camden Avenue and the Almaden Expressway and analyzed for total recoverable mercury wet weight (Tetra Tech, 2000). The results for the creekbank soils (6-inch depth) ranged from 3.8 to 65 mg/kg, with a mean of 19.7 mg/kg and a standard deviation of 13.8 (total of 26 samples).

Additional sampling has been conducted by various entities and individuals throughout the watershed, and results are summarized in Woodward-Clyde Consultants, 1992. These data principally focused on the New Almaden mine area related to site characterization efforts

TABLE 4.3-2. Mean Annual Wet-Weather Pollutant Loads for the Guadalupe River and Los Gatos Creek and the Total Loads to San Francisco Bay from the SCVURPP Area
This table indicates that the Guadalupe River contributes a significant portion of the total pollutant load discharged to San Francisco Bay from the SCVURPP area. It also indicates that pollutant loads are the greatest from residential land uses.

	Guadalupe River				Los Gatos Creek			San Francisco Bay			
Constituent (lbs/yr)	Industrial Land Use	Residential Land Use	Open Space	Total	Residential Land Use	Open Space	Total	Industrial Land Use	Residential Land Use	Open Space	Total
Flow (af)	2,170	15,649	8,108	25,927	2,764	283	3,047	4,859	49,218	26,205	80,283
Cadmium	44	94	17	155	17	1	17	99	295	54	449
Chromium	442	1,719	422	2,583	304	15	318	989	5,407	1,364	7,761
Copper	469	3,232	298	3,999	517	10	581	1,051	10,164	964	12,179
Lead	995	3,268	111	4,375	577	4	581	2,228	10,279	360	12,867
Nickel	735	4,013	935	5,683	709	33	741	1,645	12,622	3,023	17,290
Zinc	7,050	8,684	179	15,913	1,534	6	1,540	15,784	27,311	579	43,674
Nitrate (NO_3)	4,083	34,342	4,575	43,000	6,065	160	6,225	9,141	108,009	14,788	131,937
Total Kjeldahl Nitrogen	8,851	78,837	20,423	108,112	13,924	712	14,637	1,918	247,952	66,009	333,778
Ortho-phosphate	10,727	33,148	10,877	54,752	5,854	379	6,234	24,017	104,292	35,155	163,424
Biochemical Oxygen Demand	79,652	452,206	120,427	652,284	79,868	4,201	84,068	178,333	1,422,233	389,226	1,989,792
Total Suspended Solids	3,267,171	11,817,256	6,838,700	21,923,126	2,087,145	238,537	2,325,682	7,314,906	37,166,432	22,103,102	66,584,439

Source: Woodward Clyde Consultants, 1991.

and the California Department of Toxic Substances Control's efforts to remediate and stabilize the Almaden Quicksilver County Park site. In summary, a mercury concentration gradient occurs in the Guadalupe River and tributary sediments, starting in the tenths of a mg/kg total recoverable mercury near Alviso Slough and the San Francisco Bay to more than 300 mg/kg in small intermittent drainages at the Almaden mining complex (Woodward-Clyde Consultants, 1992).

Based on these site characterization studies and subsequent remedial actions, California Department of Toxic Substances Control announced its certification of the Almaden Quicksilver County Park in February 2000. Certification indicates that all appropriate removal and remedial actions have been completed. Remedial work included site containment and stabilization through placement of vegetated soil covers and streambank stabilization.

Table 1H-1 in Appendix 1H indicates that analysis for mercury in water samples has not been conducted with detection limits that are sufficiently low to allow evaluation of compliance with the applicable Basin Plan water quality objective for mercury of 0.025 ug/L. Furthermore, samples analyzed for mercury, as presented in Appendix 1H, were analyzed for dissolved mercury rather than total recoverable mercury, on which the Basin Plan water quality objective is based. Data in Appendix 1H indicate that dissolved mercury is merely a fraction of total recoverable mercury. On at least two occasions, mercury concentrations in Guadalupe River water exceeded the Basin Plan water quality objective. It is likely, given the fact that the detection limits were higher than the water quality objective and the parameter measured was dissolved mercury, that the water quality objective was exceeded more frequently than indicated by the data in Appendix 1H. There are no State or Federal standards for concentrations of sediment-bound mercury; however, the goal of the TMDL program for mercury in the San Francisco Bay is to reduce in-bay sediment concentrations to less than 0.4 mg/kg in fine sediments less than 63 micrometer.

4.3.3 Temperature

Elevated water temperatures can have significant consequences for stream organisms adapted to a cold-water environment. A rise in water temperature of only a few degrees Celsius over ambient conditions can reduce the number of, or eliminate, sensitive stream insects, such as stoneflies and mayflies, and fish such as trout. In general, sustained summertime water temperatures in excess of 21 °C (70 °F) are considered to be stressful, and perhaps lethal, to many cold water organisms. Inputs of heat can be critical for many streams that straddle the geographic and/or thermal borderline between cold water and warm water stream conditions.

The numerical water quality objective for temperature in the San Francisco Bay Basin Plan (June 21, 1995) states that the temperature of any cold or warm freshwater habitat shall not be increased by more than 2.8 °F (5 °F) above natural receiving water temperatures. The Basin Plan also states that the natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the RWQCB that such alteration in temperature does not adversely affect beneficial uses.

A number of factors can increase summertime water temperatures in urban streams. Of these, three factors often act together to increase water temperatures. First, the urban landscape, as it heats up on warm summer days, tends to impart a great deal of heat to

landscape, as it heats up on warm summer days, tends to impart a great deal of heat to runoff passing over it. Second, fewer trees are present on the urban streambank to shade the stream channel, adding to the warming effect. Third, runoff stored in shallow wet ponds and other impoundments becomes warmer between storms; following a storm, this stored runoff can be suddenly released from the impoundments and flow rapidly to the streams. Stream width and depth also affect water temperature during the periods of low-to-moderate flows during spring, summer, and fall. Water that flows as a deeper and narrower stream gains less heat by the sun than a shallower and wider stream under similar conditions.

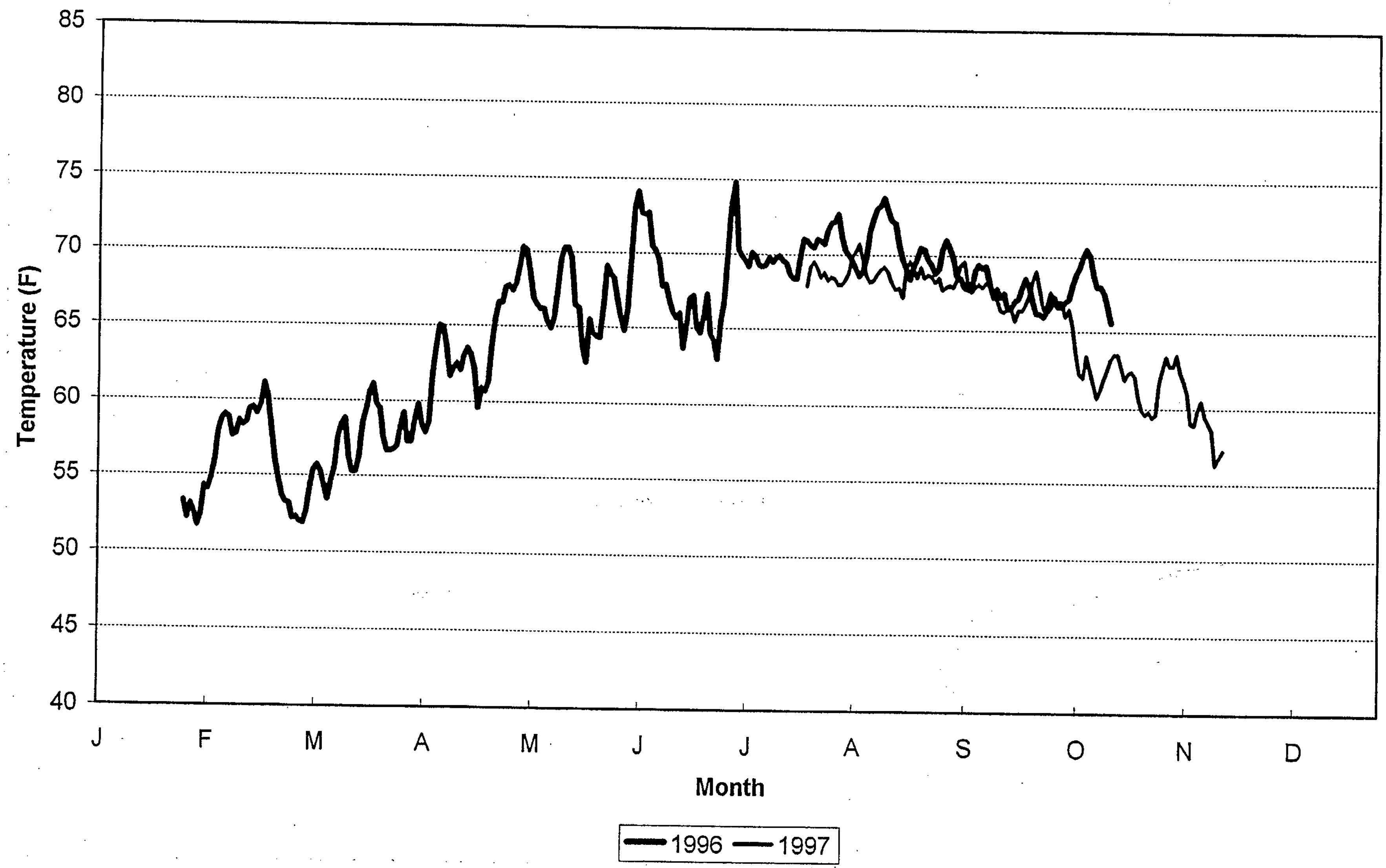
Only intermittent water temperature data for the Guadalupe River are available prior to September 1995. In September 1995, SCVWD began measuring water temperatures with continuous recording temperature probes at several locations in the Guadalupe River and its tributaries (Appendix 1A). Figure 4.3-1 shows measured water temperatures in the downtown area of the Guadalupe River near Coleman Avenue for 1996 and 1997.

Temperatures were uniformly near or above 20 °C (70 °F) during the months of July through August. Temperatures in early spring (March through May) increase steadily from 13 °C to 20 °C (55 °F to 70 °F) and depend largely on the air temperature, incident solar radiation, and amount of flow in the channel. Water temperatures decrease rapidly in October and November with the onset of cooler ambient temperatures and fewer hours of daylight. Considerably cooler water temperatures in the range of 10 °C to 15.5 °C (50 °F to 60 °F) were typical from November through March. Environmental effects of water temperature are addressed in further detail in Section 4.6.3, "Key Factors Affecting Fish and Fish Habitat."

4.3.4 Dissolved Oxygen

Dissolved oxygen levels are partially dependent on water temperature because the amount of oxygen that can be dissolved in water varies with temperature: colder water can contain more dissolved oxygen than warmer water. The amount of dissolved oxygen that is present in relation to the amount that could be dissolved at a given temperature is referred to as the saturation level. Decomposition of organic matter by microorganisms depletes dissolved oxygen levels in slow-moving receiving waters, such as lakes and estuaries. The degree of potential dissolved oxygen depletion is measured by the biochemical oxygen demand (BOD) test, which measures all the oxidizable matter present in urban runoff. Urban runoff can severely depress dissolved oxygen levels after large summer storms. BOD levels can exceed 10 to 20 mg/L during storm "pulses," which can lead to very low levels of dissolved oxygen in shallow, slow-moving, or poorly flushed receiving waters. However, during particularly large storms or cool temperatures, oxidizable matter can be flushed through the entire river system before having a chance to adversely affect dissolved oxygen. Factors involved in increasing dissolved oxygen levels include physical mixing and agitation of the water (aeration), photosynthetic production of oxygen by aquatic algae and plants, and cooler water temperatures.

Dissolved oxygen levels measured in the Guadalupe River by USGS indicate that year-round concentrations of dissolved oxygen have been generally greater than 8 mg/L and suitable for aquatic life at all measured temperature conditions (Table 1H-1 in Appendix 1H). Environmental effects of water temperature are addressed in further detail in Section 4.6.3, "Key Factors Affecting Fish and Fish Habitat."



Source: SCVWD hourly measured temperature data.

Revised

Figure 4.3-1. Measured Average Daily Water Temperatures in the Guadalupe River near Coleman Avenue

Existing measured temperatures in the Guadalupe River near Colemen Avenue are routinely near or above 70°F during the summer. Water temperatures rise steadily in the spring months and decrease rapidly in the fall months. Winter temperatures are fairly constant. Gaps on plots indicate periods when no data were collected.

4.4 Biological Resources – Vegetation

The study area for the evaluation of vegetation is the project area (Segments 1, 2, and 3 and the Reach A and Guadalupe Creek mitigation sites. In Segments 1, 2, and 3, the study area is considered to be the footprint for the project, which consists of the Guadalupe River, the adjacent riverbanks from the edge of the low-flow channel bank to the top of bank, and portions of the adjacent upland terrace. In the Reach A mitigation area, the study area includes the Guadalupe River and the adjacent riverbanks from the edge of the low-flow channel bank to the top of banks. In the Guadalupe Creek mitigation site, the study area includes the creek and the adjacent riverbanks from the edge of the low-flow channel bank to the top of bank on the south bank and to the top of the levee maintenance road on the north bank. The Guadalupe Creek mitigation site is a component of SCVWD's Guadalupe Creek Restoration Project (Section 6.2.1.6, "Guadalupe Creek Restoration Project").

Vegetation types in the study area include riparian vegetation, SRA cover vegetation, wetlands, and upland habitat. Appendix 1I provides a checklist of vascular plants observed or expected to occur in the project area. The following sections describe these habitat types and their locations.

For Segments 1, 2, and 3, the affected environment is based on preproject conditions for riparian vegetation and SRA cover vegetation. Preproject conditions are those conditions that existed prior to construction of the Segment 1 project components. The amount and location of vegetation are based on aerial photographs taken in 1990. The amount and location of wetlands and other waters of the United States are based on aerial photographs taken in 1999.

For the Reach A mitigation site, the affected environment is based on 1990 aerial photographs of preproject conditions for riparian and upland habitats, 1996 aerial photographs of preproject conditions for SRA cover vegetation, and the 2000 preproject conditions for wetlands and other waters of the United States.

For the Guadalupe Creek mitigation site, this description is based on SRA cover vegetation at Guadalupe Creek mapped in 1996 on 1995 aerial photographs and other vegetation at the Guadalupe Creek mitigation site mapped in fall 1999 (Jones & Stokes, 1999b).

4.4.1 Riparian Vegetation

The following paragraphs summarize the project-specific definitions of riparian habitat. Riparian habitat in the project area has been classified as great valley mixed riparian forest (Holland, 1986).

4.4.1.1 Segments 1, 2, and 3

The 1990 photographs show a relatively narrow corridor of riparian forest on the banks of the Guadalupe River along Segments 1, 2, and 3. Although these segments are located in the highly urbanized area of downtown San Jose, the riparian forest continues to provide important habitat for wildlife.

The preproject riparian vegetation in Segments 1, 2, and 3 extends primarily from the river's edge to the tops of the banks. Little riparian vegetation is present above the top of the bank.

The typical width of the riparian corridor is approximately 100 to 200 feet, although some areas along the river support little or no riparian vegetation. The riparian vegetation in Segments 1, 2, and 3 is classified as great valley mixed-riparian forest (Holland, 1986), which consists of a tall, dense, winter-deciduous broadleaf forest on both sides of the river.

The riparian forest corridor is made up of a tall tree canopy dominated by native and nonnative tree species. The midstory and understory are dominated by native and nonnative woody and herbaceous vegetation. The structure of the vegetation, including the density and number of canopy layers, varies within Segments 1, 2, and 3. Native tree species include cottonwood (*Populus fremontii*), black walnut (*Juglans hindsii*), willow (*Salix* sp.), boxelder (*Acer negundo*), and sycamore (*Platanus racemosa*). Nonnative tree species include blue gum eucalyptus (*Eucalyptus globulus*), black locust (*Robinia pseudoacacia*), and elm (*Ulmus* sp.). The midstory and understory include cottonwood, willow, black walnut, elderberry (*Sambucus mexicana*), coyote brush (*Baccharis pilularis*), and Himalayan blackberry (*Rubus procerus*). The herbaceous understory consists of several species of annual grasses and forbs.

Preproject riparian habitat along Segments 1, 2, and 3 totaled approximately 27.43 acres (U.S. Army Corps of Engineers, 1992). Table 4.4-1 lists the acres of preproject riparian habitat by segment. Segments 1 and 2 and Segment 3C Phases 1 and 2 include 16.95 acres of preproject riparian vegetation. Segment 3A and Segment 3B include 10.48 acres of preproject riparian vegetation.

4.4.1.2 Reach A Mitigation Site

Reach A is located between I-880 and Highway 101, adjacent to the San Jose International Airport and State Route 87, within highly urbanized downtown San Jose and directly downstream from Segment 1. The study area for the Reach A mitigation site is defined as the area between I-880 and Airport Parkway. Preproject riparian habitat along the Reach A mitigation site totaled approximately 10.87 acres (Santa Clara Valley Water District, 1999) (Table 4.4-1).

Riparian vegetation in Reach A is relatively sparse and fragmented and consists of individual trees and shrubs and small clusters of riparian vegetation. The riparian vegetation is primarily located on the upper banks and does not provide SRA overhead cover. Some areas of the riverbank have no riparian vegetation. The riparian vegetation in Reach A is classified as great valley mixed riparian forest (Holland, 1986).

The riparian habitat is made up of a tall tree canopy dominated by native and nonnative tree species. The understory is dominated by native and nonnative woody and herbaceous vegetation. The structure of the vegetation, including the density and number of canopy layers, varies throughout the Reach A mitigation site. Native tree species include cottonwood, black walnut, willow, and elderberry. Nonnative species include several Prunus species, holly oak (*Quercus ilex*), blue gum eucalyptus, and California pepper tree (*Schinus molle*). The understory shrub layer includes coyote brush and elderberry. The herbaceous understory consists of mugwort (*Artemesia douglasiana*), rice grass (*Oryzopsis miliacea*), fennel (*Foeniculum vulgare*), and black mustard (*Brassica nigra*). Noxious weeds, including giant reed (*Arundo donax*) and castor bean (*Ricinus communis*), are present in the understory of the riparian forest. Caltrans is also proposing to plant approximately 10.95

acres of riparian habitat on the upper banks of Reach A to mitigate for effects of the State Route 87 project.

4.4.1.3 Guadalupe Creek Mitigation Site

The proposed Guadalupe Creek mitigation site is a component of SCVWD's Guadalupe Creek Restoration Project (Section 6.2.1.6, "Guadalupe Creek Restoration Project"). The proposed Guadalupe Creek mitigation site would be located on Guadalupe Creek between Masson Dam and Almaden Expressway. Preproject riparian habitat totals approximately 10.10 acres (Table 4.4-1). Preproject conditions for riparian vegetation were determined using 1999 aerial photographs.

Riparian vegetation along Guadalupe Creek in the proposed mitigation site is relatively sparse and fragmented and consists of individual trees and shrubs and small clusters of riparian vegetation (Jones & Stokes, 1999b). Vegetation along Guadalupe Creek includes riparian trees and shrubs, willow scrub, shrub/vine scrub, and herbaceous riparian vegetation. The width of the riparian vegetation varies from the width of a single tree canopy to approximately 200 feet; some areas of the riverbank support no riparian vegetation. A full description of the Guadalupe Creek Restoration Project site is in the Guadalupe Creek Restoration Project EIR/EIS (in preparation).

4.4.2 Shaded Riverine Aquatic (SRA) Cover Vegetation

SRA cover vegetation is the unique, near-shore aquatic cover that grows at the interface between a river and adjacent riparian habitat. Key features of this aquatic cover include:

- An adjacent bank composed of natural, often eroding substrate that supports overhanging riparian vegetation and vegetation that may protrude into the water
- A stream channel with variable amounts of woody material and detritus and variable water velocity and depth

SRA cover vegetation is composed of two components: overhead cover and instream cover. Overhead cover consists of overhanging riparian vegetation that provides important shading and contributes leaf litter and insects to the stream. Instream cover consists of submerged woody debris (exposed roots, branches, and trunks), aquatic plants, gravel and cobble substrates, and undercut banks. Instream cover in the project area is described in Section 4.6.3, "Key Factors Affecting Fish and Fish Habitat."

The area of SRA cover vegetation is determined by the stream length and the width of SRA cover vegetation. The width of SRA cover vegetation is measured from the summer shoreline (during the summer of years of average precipitation and runoff) to the average maximum distance (perpendicular to the shoreline) within which instream cover or overhead cover grows. In relatively narrow rivers, including the Guadalupe River, instream cover and overhead cover extend across the entire river, so that the width of SRA cover vegetation is equivalent to the width of the river.

TABLE 4.4-1. Preproject Vegetation Resources in the Guadalupe River Project Area
The project area supports riparian vegetation, wetlands, other waters of the United States, and SRA cover vegetation. The greatest amounts of riparian vegetation and SRA cover vegetation are located in Segment 2.

Project Area	Riparian Vegetation (ac)[a]	Wetlands (ac)	Other Waters of the United States (ac)	SRA Cover (lf)
Segment 1	2.82[b]	0	1.22	2,402[c]
Segment 2	12.21[c]	0	2.94	6,252[c]
Segment 3C Phase 1	0.34[d]	0	0[f]	183[d]
Segment 3C Phase 2	1.58[d]	0	1.40	919[d]
Segment 3A	4.52[e]	0	2.44	3,062[e]
Segment 3B	5.96[e]	0	2.82	3,839[e]
Subtotal	**27.43**	**0**	**10.82[h]**	**16,657**
Reach A mitigation site	10.87	1.97[g]	6.45[i]	118
Guadalupe Creek mitigation site[j]	10.10	1.23	4.64	2,398
Total	**48.40**	**3.20**	**21.91**	**19,173**

Note: Preproject is prior to construction of the Authorized Project.

[a] Preproject riparian canopy mapping assumed that native and nonnative trees and shrubs growing on or near the top of the bank and connected to the riparian canopy were included in the original riparian habitat mapping performed for the 1992 Mitigation and Monitoring Plan. The 1992 plan identified approximately 32 acres of riparian vegetation, including in the Woz Way to Park Avenue bypass reach, which is no longer considered part of the No-Action or Guadalupe River Project with Bypass System Alternative Alternatives.

[b] Preproject conditions for Segment 1 were mapped on Plates 1 and 2 of the 1992 Mitigation and Monitoring Plan (east bank) and on an orthophoto contour mapping blueline (west bank). The photo date is not known, but the photographs reflect preproject conditions. Postproject conditions were mapped on bluelines dated August 15, 1996.

[c] Preproject conditions for Segments 1 and 2 were mapped on bluelines dated October 27, 1990.

[d] Preproject conditions for Segment 3C were mapped on bluelines dated October 27, 1990 (downstream from I-280) and November 3, 1990 (upstream from I-280).

[e] Preproject conditions for Segments 3A and 3B were mapped on bluelines dated October 27, 1990.

[f] Segment 3C Phase 1 includes the east bank. No waters of the United States are located in this phase.

[g] Wetlands in the Reach A mitigation site consist of 1.11 acres of riverine wetland and 0.65 acres of first terrace wetland.

[h] Other waters of the United States in the project area consist of 10.82 acres of open water channel.

[i] Other waters of the United States in the Reach A mitigation site consist of 4.71 acres of open water channel and 1.74 acres of gravel bars.

[j] The Guadalupe Creek mitigation site is a component of SCVWD's Guadalupe Creek Restoration Project.

Note: There are no wetlands present in Segments 3A, 3B, or 3C. No wetlands were identified in Segments 1 and 2 during preconstruction surveys (U.S. Army Corps of Engineers, 1985).

4.4.2.1 Segments 1, 2, and 3

A total of 16,657 lf of preproject SRA cover vegetation was located within Segments 1, 2, and 3 (Table 4.4-1). Because the Guadalupe River is relatively narrow, SRA cover vegetation extends across the entire river in some areas. Native tree species making up the SRA cover vegetation are the same as discussed in Section 4.4.1.1, "Riparian Vegetation."

4.4.2.2 Reach A Mitigation Site

Approximately 118 lf of existing preproject SRA cover vegetation is located in the Reach A mitigation site. Preproject SRA cover vegetation is provided by an individual mature cottonwood tree and small clusters of riparian tree and shrub seedlings. Existing preproject SRA cover vegetation is not located within any of the proposed SRA cover vegetation planting areas (Section 3.4.2.9, "Onsite and Offsite Mitigation Areas"). SRA cover vegetation at the Reach A mitigation site was mapped in 1997 on 1996 aerial photographs.

4.4.2.3 Guadalupe Creek Mitigation Site

The proposed Guadalupe Creek mitigation site is a component of SCVWD's Guadalupe Creek Restoration Project (Section 6.2.1.6, "Guadalupe Creek Restoration Project"). The proposed Guadalupe Creek mitigation site contains a total of 2,398 lf of preproject SRA cover vegetation. SRA cover vegetation at Guadalupe Creek was mapped in 1996 on 1995 aerial photographs. Individual trees or clusters of trees provide SRA cover vegetation. A full description of the Guadalupe Creek Restoration Project site is in the Guadalupe Creek Restoration Project EIR/EIS (in preparation).

4.4.3 Wetlands and Other Waters of the United States

The following paragraphs summarize the project-specific definitions of wetlands and other waters of the United States. Sites that qualify as wetlands and other waters of the United States, as defined by the Corps of Engineers 1987 wetland delineation manual (Environmental Laboratory, 1987), are described below. Wetlands were classified using a modified system based on Holland's habitat classification system (Holland, 1986). Wetlands identified in the study areas include riverine wetland and first terrace wetland. Other waters of the United States consist of open water channel and gravel bars.

4.4.3.1 Segments 1, 2, and 3

A wetland delineation conducted in April 2000, based on the Corps of Engineers 1987 wetland delineation manual (Environmental Laboratory, 1987), concluded that no wetlands are present in Segments 3A, 3B, and 3C. A wetland delineation conducted in 1985 concluded that no wetlands were present in Segments 1 and 2. The April 2000 delineation concluded that 10.82 acres of other waters of the United States are present in Segments 1, 2, and 3 (Table 4.4-1).

Other waters of the United States in Segments 1, 2, and 3 include open water channel. This habitat type is largely devoid of vegetation and was based on the open water surface area observed during the April 2000 surveys.

4.4.3.2 Reach A Mitigation Site

A wetland delineation conducted in April 2000, based on the Corps of Engineers 1987 wetland delineation manual (Environmental Laboratory, 1987), concluded that 1.97 acres of wetlands and 6.45 acres of other waters of the United States are present in the Reach A mitigation site (Table 4.4-1). A total of 1.11 acres of riverine wetlands was identified in the Reach A mitigation site. Wetlands occurring in Reach A were classified by the following four attributes: position relative to the Guadalupe River, vegetation, hydrologic regime, and soil type. The two wetland types identified are: (1) riverine wetlands within the ordinary high water mark of the river and (2) first terrace wetland. The first terrace wetlands are located on portions of the floodplain terraces that are proposed for the planting of SRA cover vegetation mitigation (Section 3.4.2.9). Riverine wetlands in Reach A range from discontinuous patches of varying length located along the edges of the base-flow channel of the Guadalupe River to patches of varying size located on low-lying benches and bars below the river's ordinary high water mark. The riverine wetlands are characterized by perennial emergent marsh vegetation and creeping macrophytes. The dominant species of the riverine wetlands in Reach A include cattail, bur-reed, bulrush (*Schoenoplectus acutus*), water primrose (*Ludwigia peploides*), and smartweed (*Polygonum* sp.).

A total of 0.65 acre of first terrace wetland was identified in the Reach A mitigation site. First terrace wetlands consist of relatively small patches on the lower floodplain terraces adjacent to the edge of the base flow channel. First terrace wetlands may be located above or below the river's ordinary high water mark, depending on the location of the individual wetland. These wetlands are subject to variable inundation and hydrologic conditions on a seasonal and an annual basis. First terrace wetlands are dominated by perennial herbaceous wetland vegetation, as well as riparian tree and shrub seedlings. Wetlands were classified using a modified system based on Holland's habitat classification system (Holland, 1986). Herbaceous wetland species include creeping wildrye (*Leymus triticoides*), white top (*Lepidium latifolium*), water smartweed (*Polygonum amphibium* var. *emersum*), and marsh horsetail (*Equisetun palustra*). Riparian species include red willow (*Salix laevigata*), narrow-leaved willow (*Salix exigua*), Fremont's cottonwood (*Populus fremontii*), and box elder (*Acer negundo*).

Other waters of the United States in the Reach A mitigation site include open water channel and unvegetated gravel bars. A total of 4.71 acres of open water channel was identified in the Reach A mitigation site. This habitat type is largely devoid of vegetation and was based on the open water surface area observed during the April 2000 surveys. A total of 1.74 acres of gravel bars was identified. Gravel bars occur within the ordinary high water mark; however, they typically lack a clear dominance by hydrophytic vegetation and do not exhibit hydric soil indicators.

4.4.3.3 Guadalupe Creek Mitigation Site

The proposed Guadalupe Creek mitigation site is a component of SCVWD's Guadalupe Creek Restoration Project (Section 6.2.1.6, "Guadalupe Creek Restoration Project"). Wetlands in Guadalupe Creek are classified as riverine and range from small, narrow, discontinuous patches along the edges of the base-flow channel to patches of varying sizes on low-lying benches and bars below the ordinary high water mark (Jones & Stokes, 1999).

In fall 1999, SCVWD performed a wetland delineation for the proposed Guadalupe Creek mitigation site. The preliminary delineation report identifies a total of 1.23 acres of jurisdictional riverine wetlands (Jones & Stokes, 1999a). In addition to the jurisdictional wetlands, 4.64 acres of waters of the United States is present along Guadalupe Creek. Waters of the United States at the Guadalupe Creek mitigation site include 2.76 acres of open water, 0.84 acre of vegetated gravel bar, and 1.04 acres of unvegetated gravel bar. A full description of the Guadalupe Creek Restoration Project site is in the Guadalupe Creek Restoration Project EIR/EIS (in preparation).

4.4.4 Ruderal Scrub and Herbaceous Vegetation

The following paragraphs summarize the project-specific definitions of upland habitats. The classification systems for these upland habitats differ because the upland habitats were mapped separately for other projects. The upland habitats were classified using a modified system based on Holland's habitat classification system (Holland, 1986). Although the terms used to define these habitat types differ, the vegetation provides similar functions and values for wildlife. The terms used to define these habitats were not modified because the terms would not match those found in the environmental documents for the other projects.

4.4.4.1 Segments 1, 2, and 3

No vegetation was classified as upland vegetation in the Segments 1, 2, and 3 reaches (U.S. Army Corps of Engineers, 1992). Based on the 1990 aerial photographs, most of the project footprint is covered by riparian vegetation and open water channel. Herbaceous upland vegetation is visible at openings in the riparian canopy; however, this herbaceous vegetation was considered to be understory vegetation beneath or adjacent to the riparian canopy.

4.4.4.2 Reach A Mitigation Site

Upland vegetation in the Reach A mitigation site was mapped in 1990 (Santa Clara Valley Water District, 1999). Upland vegetation was classified as ruderal scrub and ruderal herbaceous. Existing ruderal scrub habitat along the Reach A mitigation site totals approximately 9.22 acres. Ruderal scrub habitat consists of shrubby vegetation and is primarily located on the upper slopes of the riverbank. The dominant species are coyote brush, elderberry, and nonnative tree and shrub species.

Approximately 13.01 acres of ruderal herbaceous habitat are present in the Reach A mitigation site. (Santa Clara Valley Water District, 1999). This vegetation consists of weedy native and nonnative herbaceous vegetation. The vegetation is primarily located on floodplain benches. The dominant species are wild oat (*Avena barbata*), white sweet clover (*Melilotus albus*), ripgut brome (*Bromus diandrus*), and mustard (*Brassica* sp.).

4.4.4.3 Guadalupe Creek Mitigation Site

The proposed Guadalupe Creek mitigation site is a component of SCVWD's Guadalupe Creek Restoration Project (Section 6.2.1.6, "Guadalupe Creek Restoration Project"). Upland vegetation in the proposed Guadalupe Creek mitigation site was mapped by SCVWD in 1999. Upland vegetation was classified as annual grasslands (Jones & Stokes, 1999b). Existing annual grassland habitat totals approximately 32.16 acres. Ruderal scrub and ruderal herbaceous vegetation identified in the fall 1991 mapping of the Guadalupe Creek

mitigation site have been classified as annual grasslands (Jones & Stokes, 1999b). The dominant species in the annual grasslands are nonnative annual grasses and low forbs, including wild oat (*Avena fatua*), yellow star-thistle (*Centaurea solstitulis*), brome (*Bromus molliformis*), and sweet fennel (*Foeniculum vulgare*), as well as scattered vines and shrubs. A full description of the Guadalupe Creek Restoration Project site is in the Guadalupe Creek Restoration Project EIR/EIS (in preparation).

4.4.5 Special-Status Plants

Special-status plant species with the potential to occur in the study area were identified from a species list provided by USFWS and by a search of CDFG National Diversity Data Base (NDDB).

The September 1999 species list provided by USFWS included all the special-status species with the potential to occur in Santa Clara County. The USFWS species list included three plant species listed or proposed for Federal listing. These species include Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon*), Santa Clara Valley dudleya (*Dudleya setchellii*), and Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*) (Appendix 1J). A review of available information on these federally listed species, including 1985 surveys conducted by USFWS (U.S. Army Corps of Engineers, 1985), indicates that none of these plants or their habitats are present in Segments 1, 2, or 3 or Reach A (Santa Clara Valley Water District, 1999).

The search of CDFG NDDB was performed in January 2000. The search was performed on all USGS quadrangle maps in which the Guadalupe River and its tributaries are located. State-listed species or species proposed for listing with the potential to occur in the study area included those species identified on the USFWS species list. Based on a review of available information and field surveys, no special-status plants or their habitats are present in the study area.

4.5 Biological Resources – Wildlife

The study area for the evaluation of wildlife is Segments 1, 2, and 3; the Reach A mitigation site; and the Guadalupe Creek mitigation site. The study area contains a mosaic of habitats, ranging from mature cottonwood forest to open herbaceous vegetation along disturbed channels. A few stands of mature multistoried riparian plant communities are present. Cottonwood willow, sycamore, box elder, walnut, and other trees dominate these communities. Most of the riparian corridor along the Guadalupe River is narrow and discontinuous and is constrained by adjacent land uses. The lands surrounding the river have been developed into residential, commercial, and light industrial areas.

Riparian habitat in the study area provides important values for wildlife in the Santa Clara Valley because the habitat:

- Provides refuge for wildlife species in an urban environment
- Supports migratory neotropical songbirds not found in adjacent areas
- Provides a movement corridor for such wildlife as small mammals, amphibians, and resident birds between San Francisco Bay, the valley floor, and foothill habitats

- Adds to the total amount of habitat in the local environment with value to wildlife
- Contributes to maintaining a wide range of wildlife species in adjacent habitats, including urban areas

Wildlife observed or expected to occur in the study area are indicated in Appendix 1I.

4.5.1 Riparian and Wetland Wildlife Species

Riparian habitats are considered to be among the most productive habitats for wildlife in California, and riparian forests support the most dense and diverse wildlife communities in the Santa Clara Valley. Riparian habitats often contain special ecological features that are not found in upland areas (Brinson et al., 1981). The availability of water, the diversity and abundance of plant life, and the complex vegetation structure provide a variety of wildlife species with food and cover as well as breeding and resting sites. The abundance of wildlife species is generally greater in riparian habitats than in adjacent habitats because of the juxtaposition of aquatic and terrestrial habitats and the high proportion of habitat edge. Wildlife typically frequent the habitat edges, which are the areas where different vegetation types meet. Additionally, riparian corridors function as important corridors for wildlife movement. CDFG has designated riparian corridors as habitat of special concern in California because of their high value to wildlife and their limited distribution.

Riparian habitat in Segments 1, 2, and 3 is generally a narrow corridor. The existing riparian corridor is interrupted by road bridges and pedestrian trails. Riparian habitat at the Reach A mitigation site is sparse and discontinuous. Riparian habitat at the Guadalupe Creek mitigation site is also relatively sparse and fragmented, consisting of individual trees and shrubs and small clusters of riparian vegetation (Jones and Stokes Associates, 1999b).

Mammals that inhabit the study area do not require a continuous corridor from one habitat area to another, require only small home ranges, and are tolerant of human activity and urbanization. These mammals include Virginia opossum, raccoon, Trowbridge shrew, broad-footed mole, fox squirrel, Botta's pocket gopher, and feral cat. Mammals that use riparian habitats and also require large home ranges and migration corridors, such as coyote and bobcat, have been eliminated from Segments 1, 2, and 3.

Riparian habitat supports abundant aquatic and terrestrial invertebrates that are prey for amphibians, reptiles, small mammals, and insectivorous birds. Urban streams, such as the Guadalupe River, support few amphibian and reptile species because urbanization has reduced habitat values. Common amphibian species in the study area include Pacific treefrog, western toad, and bullfrog.

Bird species occurring and nesting in the study area include mourning dove, belted kingfisher, and various songbirds, such as black phoebe, yellow warbler, lesser goldfinch, and California towhee. Other birds likely to occur in the study area include California quail, red-tailed hawk, red-shouldered hawk, yellow-rumped warbler, and ruby-crowned kinglet.

Wetland habitats are considered to be among the most productive habitats for wildlife in California. Wildlife species known to occur in marsh and aquatic habitats include western toad, bullfrog, Pacific treefrog, western aquatic garter snake, great blue heron, great egret, green-backed heron, mallard, belted kingfisher, and black phoebe. Freshwater marsh occurs

on the Reach A and Guadalupe Creek mitigation sites (Section 4.4.3, "Wetlands and Other Waters of the United States"). A variety of factors reduce the wildlife value of freshwater marsh and aquatic habitat in the study area, including urban pollution, habitat fragmentation, and habitat loss. The narrowness of the Guadalupe River in Segments 1, 2, and 3 limits the suitability of this habitat for species that prefer large areas of open water.

4.5.2 Special-Status Wildlife Species

On September 23, 1999, USFWS provided a list of special-status species with the potential to occur in the study area (Appendix 1J). The list includes 15 wildlife species that are State or federally listed or are proposed for listing as threatened or endangered. Of these 15 species, only the California red-legged frog (red-legged frog) (*Rana aurora draytonii*) has the potential to occur in the project area. Although the remaining species on the USFWS list are proposed for listing, they are not discussed because (1) their range does not include the study area or (2) no suitable habitat exists in the study area (Table IJ-4 in Appendix 1J). In response to local interest, burrowing owls and southwestern pond turtles are also addressed. These species are State species of special concern and Federal species of concern.

Chapter 6, "Cumulative Impacts and Other Required Analyses," discusses special-status salt marsh species that occur in the lower Guadalupe River and Alviso Slough area: western snowy plover (*Charadrius alexandrinus nivosus*), California clapper rail (*Rallus longirostris obsoletus*), and salt marsh harvest mouse (*Reithrodontomys raviventris*).

4.5.2.1 California Red-Legged Frog

The red-legged frog is federally listed as threatened and is a State species of special concern. No critical habitat for this species has been designated. The red-legged frog occupies a fairly distinct habitat, combining both specific aquatic and riparian components. The adult red-legged frog requires dense or shrubby riparian or emergent vegetation, such as cattail and tule marsh, that is closely associated with water that is both deep (more than 2 feet) and either still or slow-moving. The largest densities of red-legged frogs are associated with deep-water pools with dense stands of overhanging willow and an intermixed fringe of emergent vegetation. Emergent vegetation is important for breeding; the female deposits egg masses on vertical stems of emergent vegetation so that the egg masses float on the surface of the water (Hayes and Miyamoto, 1984). The breeding season is in the rainy months, usually from November through March (Stebbins, 1985).

Habitat necessary for estivation (reduced activity during late summer and early fall) is essential for the survival of red-legged frogs in a watershed. Red-legged frogs estivate in small mammal burrows and moist leaf litter (Jennings and Hayes, 1985). Red-legged frogs have been found up to 100 feet from water in adjacent dense riparian vegetation for as long as 77 days (Rathbun et al., 1993). In coastal areas, the use of the adjacent riparian corridor was most often associated with drying of coastal creeks in mid- to late summer (Rathbun et al., 1993). Although red-legged frogs typically remain near streams or ponds, unpublished information indicates that they are capable of moving 1 mile or more in upland habitat or through ephemeral drainages (Westphal, pers. comm.). The availability of estivation habitat and the ability to access such habitat may be a limiting factor in population numbers and survival.

Distribution. Historically, red-legged frogs ranged from northern California to Baja California and west of the Cascade-Sierra crest. This range includes the Guadalupe River watershed. Red-legged frogs inhabit elevations from sea level to 5,000 feet (Jennings and Hayes, 1994). The red-legged frog's habitat once included parts of California's Central Valley and the Sierra Nevada foothills, but the frog now appears to be absent from the Central Valley and to occur in only isolated areas in the Sierra Nevada foothills.

Endangerment. In the late 1800s and early 1900s, the red-legged frog was heavily marketed as a source of frog legs for human consumption. Consequently, breeding in the early 1900s was reduced to the point that red-legged frog populations became too minimal to record. Introduction of the bullfrog (*Rana catesbeiana*) to California as an additional source of frog legs added to the decline of the red-legged frog population because of competition and predation from the bullfrog (Jennings and Hayes, 1985). The red-legged frog currently faces habitat loss, habitat alteration, and competition with introduced exotic predators, such as bullfrog, largemouth bass (*Micropterus salmoides*), and green sunfish (*Lepomis cyanellus*). The most secure populations of red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack exotic predators.

Occurrence in the Guadalupe River Watershed. A number of red-legged frog observations in the Guadalupe River watershed date from 1904 to 1997 (Figure 4.5-1). These observations represent museum collection and university records (1904 through 1983), as well as unpublished CDFG records (observed before 1980 but with no specific dates given) and USFWS records (1997). Recorded observations of red-legged frogs in Segments 1, 2, and 3 were made in 1904, 1922, and at an unspecified time before 1980; recorded observations upstream from the Guadalupe Creek mitigation area were made in 1973, 1977, and before 1980. Red-legged frogs also were observed in 1983 and 1997 in Arroyo Calero just below Calero Reservoir (H. T. Harvey and Associates, 1997, Haas, pers. comm.). The observation closest to the study area that is listed in the NDDB occurred in 1989. This observation was in Los Gatos Creek, approximately 1.5 miles upstream from Lexington Reservoir or approximately 10 miles upstream from the confluence of Los Gatos Creek and the Guadalupe River (Natural Diversity Data Base, 1996) (Figure 4.5-1). Most recently, red-legged frogs were observed in the Guadalupe River watershed in 1996 (H. T. Harvey and Associates, 1997). This observation was made in Alamitos Creek just downstream from Almaden Reservoir (Figure 4.5-1), approximately 12 miles from Segments 1, 2, and 3.

Between 1993 and 1995, the Coyote Creek Riparian Station conducted surveys in the Guadalupe River watershed for red-legged frogs. No red-legged frogs were found (H. T. Harvey and Associates, 1997). SCVWD biologists have been intermittently conducting red-legged frog surveys in the Guadalupe River watershed. Their surveys have not found the species (Padley, pers. comm.). In 1997, H. T. Harvey and Associates prepared for SCVWD a countywide report on red-legged frog occurrence in Santa Clara County, including the Guadalupe River watershed. This report indicated that no extant red-legged frog populations are present in Segments 1, 2, and 3 or in the Reach A mitigation area (H. T. Harvey and Associates, 1997).

In 1997, red-legged frog surveys were conducted in the upper portion of the Guadalupe River watershed from just downstream from Almaden Lake to I-280 (Santa Clara Valley

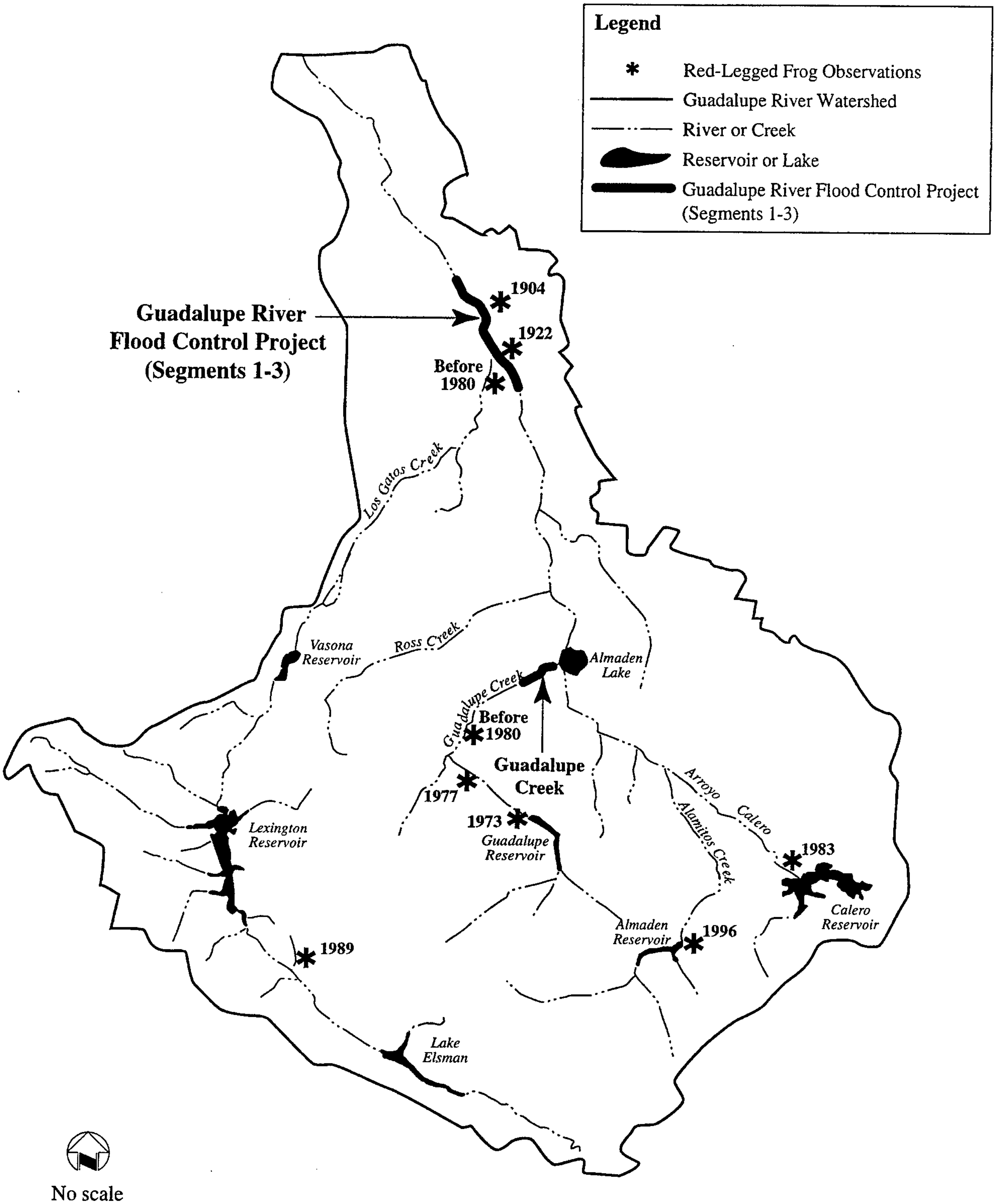


Figure 4.5-1. Guadalupe River Watershed Including Flood Protection Project and Mitigation Areas and California Red-Legged Frog Observations

Water District and U.S. Army Corps of Engineers, 2000a). No red-legged frog larvae, metamorphs, juveniles, or adults were observed during these surveys.

Occurrence in the Study Area. In April 1997, the Corps conducted day surveys in Segments 1, 2, and 3 and in Guadalupe Creek. Based on input from USFWS that indicated that red-legged frogs were unlikely to occur in Reach A, surveys were not conducted in this area. (U.S. Army Corps of Engineers, 1999). The surveys were conducted using USFWS red-legged frog survey protocol (dated February 18, 1997). The survey protocol calls for day and night surveys. With the approval of USFWS, the Corps did not conduct night surveys because of safety concerns. No red-legged frog larvae, metamorphs, juveniles, or adults were observed (Jones & Stokes Associates, 1997).

The surveys revealed the following factors in Segments 1, 2, and 3 and in Guadalupe Creek that contribute to poor habitat conditions for the red-legged frog: presence of predatory species (bullfrogs, largemouth bass, and green sunfish), potentially poor water quality caused by water pollution and storm runoff, and the extent and proximity of urban development. In 1999, the Corps conducted red-legged frog surveys in Segment 3C as part of preconstruction clearance surveys for Segment 3C Phase I. No red-legged frog larvae, metamorphs, juveniles, or adults were observed during these surveys.

In October 1999, red-legged frog surveys were conducted in the Guadalupe Creek mitigation area as part of the Guadalupe Creek Restoration Project. No red-legged frog larvae, metamorphs, juveniles, or adults were observed during these surveys. The survey found only marginal habitat for the red-legged frog.

4.5.2.2 Burrowing Owl

The burrowing owl is a State species of special concern; the western subspecies of the burrowing owl is a Federal species of concern.

Distribution. Historically, the burrowing owl was common throughout lowland California. However, a decline first noticed in the 1940s has continued to the present (Grinnell and Miller, 1944, Remsen, 1978, DeSante, pers. comm.). In the San Francisco Bay Area and the central portion of the Central Valley (from Yolo County south to Merced County), the burrowing owl population has declined by 65 percent since 1986 (DeSante, pers. comm.).

Burrowing owls today occur throughout the lowlands of California. They breed and roost in burrows, especially the burrows of the California ground squirrel. Burrowing owls often nest in open fields, on roadside embankments, on levees, and along irrigation canals. They prefer open, dry, and nearly level grasslands; prairie habitats; agricultural fields; and large vacant lots. These owls use burrows during the breeding season (February-September) for nesting and during the nonbreeding season (October – January) for cover.

Endangerment. The burrowing owl population has declined primarily because of pesticide use, rodent control programs, and habitat loss and degradation from development (Remsen, 1978). The burrowing owl's ground-oriented behavior, especially that of fledglings, makes the species vulnerable to being hit by cars, disturbed during road and levee maintenance operations, and generally harassed by domestic pets and pedestrians (Remsen, 1978).

Occurrence in the Guadalupe River Watershed. Numerous protocol-level and reconnaissance-level surveys for burrowing owls have been conducted in the Guadalupe River watershed using CDFG procedures. Protocol-level surveys are more formal and rigorous than reconnaissance-level surveys. During 1986 and 1987 surveys, a resident pair of burrowing owls was present along the banks of the Guadalupe River in the upper portion of the watershed (Reach 12). In 1995, surveys were conducted for burrowing owls during the breeding season between Branham Lane and Blossom Hill Road in the upper Guadalupe River watershed and along Reach A. These areas provide potential (low- to moderate-quality) burrowing owl habitat, but no burrowing owls were observed during the surveys. In 1998, burrowing owls were present on Canoas Creek near Branham Lane (Padley, pers. comm.). Currently, burrowing owls occur at Chynoweth Light Rail Station, which is just east of the Guadalupe River and downstream from State Route 85 (Padley, pers. comm.).

No CDFG protocol-level surveys have been conducted along Segments 1, 2, and 3 or at the Guadalupe Creek mitigation site. However, in May, June, and August 1999, no burrowing owls, ground squirrels, or potential burrows were observed in the area of the Guadalupe Creek mitigation site during biological and vegetation surveys. This finding indicates that no or few potential burrows would be available for burrowing owls at the Guadalupe Creek mitigation site. Because of continued human disturbance and low habitat quality, it is unlikely that burrowing owls would occur along Segments 1, 2, and 3, at the Reach A mitigation site, or at the Guadalupe Creek mitigation site. SCVWD biologists have also visited these areas and have indicated that they do not expect burrowing owls to occur in them (Padley, pers. comm.).

4.5.2.3 Southwestern Pond Turtle

The southwestern pond turtle (a subspecies of the western pond turtle) is a Federal species of concern and a State species of special concern. The western pond turtle was petitioned for Federal listing on January 15, 1992, along with the northwestern and southwestern subspecies of the western pond turtle. Segments 1, 2, and 3 of the Guadalupe River mitigation site, the Reach A mitigation site, and the Guadalupe Creek mitigation site are within the range of the southwestern subspecies of the pond turtle. On August 11, 1993, USFWS announced that the western pond turtle did not meet the requirements for listing as an endangered or a threatened species but that the petition could be revised and resubmitted in the future.

Pond turtles lay their eggs in upland areas, such as scrub, grassland, and savanna habitats during spring months. Ponds and slow-moving streams provide suitable rearing and foraging habitat as well as cover for pond turtles. Hatchling pond turtles require shallow water with little or no current and emergent vegetation for cover. Pond turtles are a slow-growing, long-lived species that can live to be more than 40 years old.

Distribution. The southwestern pond turtle occurs from the San Francisco Bay area south to Baja California. Historically, pond turtles have occurred in the Guadalupe River watershed (Holland, pers. comm.).

Endangerment. Pond turtle populations have declined because of the loss of and degradation to wetlands, streams, and adjacent upland habitats. In urban areas, water pollution and storm runoff reduce habitat quality for turtles. Urban development also reduces the quality

and quantity of upland nesting habitat. Nonnative predators such as bullfrogs, domestic animals, and nonnative fish can also reduce or limit local pond turtle populations.

Occurrence in the Guadalupe River Watershed. The Guadalupe River in the study area is considered poor-quality aquatic and upland habitat for the pond turtle. Much of the land adjacent to the Guadalupe River has been developed, and some of the little remaining open space is intensively farmed. These activities have eliminated most of the potential upland nesting areas for pond turtles along the riverbanks. The land adjacent to Guadalupe Creek is characterized by an upland corridor surrounded by residential development (Section 4.4.4, "Ruderal Scrub and Herbaceous Vegetation"). Potential low-quality nesting areas along Segments 1, 2, and 3 exist at the UPRR parcel and in vacant lots. Potential low-quality nesting sites also occur along Guadalupe Creek.

Previous flood protection projects, including reservoirs and bank stabilization projects, also have reduced the quality of pond turtle habitat along the Guadalupe River, Guadalupe Creek, and other tributaries. Nonnative, invasive plant species are common along the Guadalupe River and further reduce habitat quality for pond turtles. The alteration of the river and its tributaries for flood protection has eliminated or altered the distribution and quality of pools used by pond turtles. Basking sites also appear to be limited along the river and its tributaries, possibly because of previous flood protection projects.

Surveys for reptiles, amphibians, and other wildlife were conducted along Reach A, the Guadalupe River upstream from I-280, and Guadalupe Creek in the 1980s (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 1998). No pond turtles were observed during these surveys. In addition, 1993 and 1995 wildlife surveys did not reveal the presence of the turtle. Dr. Dan Holland did not see pond turtles along the Guadalupe River between Coleman Avenue and Taylor Street and between Taylor Street and Hedding Street during his surveys on July 18 and 19, 1994. However, Dr. Holland was shown videotape of a male pond turtle recorded in or near his survey area (Holland, pers. comm.). SCVWD biologists surveyed several reaches of the Guadalupe River for pond turtles between January 1996 and July 1997. These surveys included approximately 109 trap nights and covered the area from Airport Parkway to Montague Expressway. No pond turtles were found in the surveyed reaches. In addition, SCVWD staff did not observe any pond turtles while conducting salmon redd surveys in these same reaches in 1995, 1996, and 1997 (Padley, pers. comm.). In 1997, Jones & Stokes biologists did observe pond turtles at Calero Reservoir and in Alamitos Creek above Mazzone Drive.

The presence of bullfrogs, nonnative predatory fish, and other predatory animals (for example, striped skunks, opossums, raccoons, herons, and dogs) increases the level of predation of turtle eggs and young turtles along the Guadalupe River and its tributaries. Competitors such as the red-eared turtle also occur in the area. Water pollution and storm runoff, as well as the proximity of urban development to the river, also reduce habitat quality for pond turtles. Dr. Holland has estimated that the density of pond turtles in disturbed habitats, including some sections of the Guadalupe River, would be from only 2.5 to 5 pond turtles per acre of water surface. In optimal-quality habitats, over 2,400 pond turtles per acre of water surface could be present (Holland, pers. comm.).

Despite these factors, a small number of pond turtles appear to exist along the upper Guadalupe River and Guadalupe River tributaries. The potential exists for individual pond

turtles to migrate into the study area from upstream areas. The negative survey results, presence of predatory animals, water pollution, and proximity of urban development suggest that there are no pond turtles present in the project area.

4.6 Biological Resources – Fish

4.6.1 Fish Known to Occur in the Guadalupe River

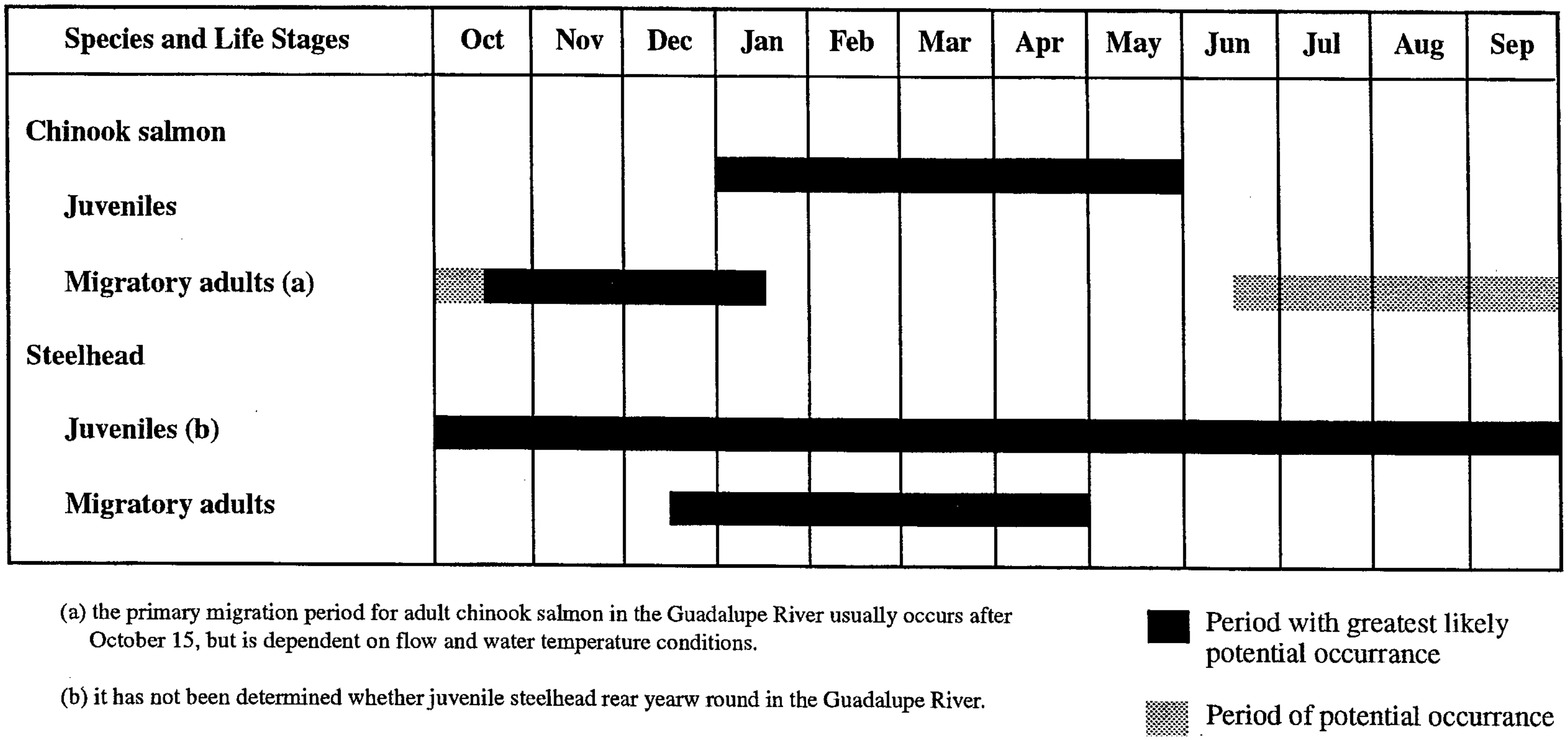
The study area for the evaluation of fisheries focuses on the project area and generally encompasses the Guadalupe River watershed, providing information on factors potentially affecting abundance and distribution of fish species in the Guadalupe River. The Guadalupe River supports anadromous and resident fish species typical of coastal and Bay Area rivers and streams. Anadromous species are fish that mature in the ocean and migrate to freshwater to spawn. Juvenile anadromous fish spend variable periods in freshwater before migrating to the ocean. Anadromous species found in the Guadalupe River include chinook salmon (*Oncorhynchus tschawytschya*), steelhead/rainbow trout (*O. mykiss*), and Pacific lamprey (*Lampetra tridentata*). Anadromous fish are found primarily in the main stem of the Guadalupe River because dams and other channel structures block or impede access to tributary streams (Figure 4.5-1).

Resident species are fish that spend their entire lives in freshwater. The Guadalupe River supports both native and introduced resident species. Native resident species include Sacramento sucker (*Catostomus occidentalis*), California roach (*Hesperoleucus symmetricus*), hitch (*Lavinia exilicauda*), prickly sculpin (*Cottus asper*), and riffle sculpin (*Cottus gulosus*). Introduced resident species include largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), goldfish (*Carassius auratus*), carp (*Cyprinus carpio*), mosquitofish (*Gambusia affinis*), brown bullhead (*Ictalurus nebulosus*), and pumpkinseed (*Lepomis gibbosus*) (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 1998). Tributaries in the upper reaches of the Guadalupe River basin support primarily native species, such as rainbow trout, California roach, Sacramento sucker, and sculpin.

Figure 4.6-1 and Table 4.6-1 display the approximate temporal occurrence of chinook salmon and steelhead life stages in the Guadalupe River. Resident species occur in the Guadalupe River year-round. Adult Pacific lamprey migrate upstream to spawn from April through July (Moyle, 1976). After hatching, larval lamprey burrow into sand and mud substrates. The larvae mature into juvenile lamprey and spend 3 to 7 years in stream habitat before migrating to the ocean.

4.6.2 Special-Status Fish Species

Steelhead and chinook salmon are special-status fish species that occur in the study area. The Central California Coast steelhead evolutionarily significant unit (ESU) has been listed as threatened under the ESA (62 FR 159, August 18, 1997), and the Guadalupe River is designated as critical habitat for the Central California Coast steelhead ESU (65 FR 7764, February 16, 2000). NMFS considers the chinook salmon in the Guadalupe River to be part of the Central Valley fall and late-fall run chinook salmon ESU. NMFS has determined that the Central Valley fall and late-fall run chinook salmon ESU does not warrant listing, but the ESU is considered a candidate species (64 FR 50394, September 16, 1999). In addition, the Guadalupe River is considered essential fish habitat for chinook salmon. The Magnuson-



(a) the primary migration period for adult chinook salmon in the Guadalupe River usually occurs after October 15, but is dependent on flow and water temperature conditions.

(b) it has not been determined whether juvenile steelhead rear yearw round in the Guadalupe River.

Source: Shapovalov and Taft 1954, White 1993, Moyle 1976.

Figure 4.6-1. Approximate Temporal Occurrence of Chinook Salmon and Steelhead Trout in the Guadalupe River

Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), defines essential fish habitat as waters and substrate necessary for fish to spawn, breed, feed, and grow to maturity.

Historically, steelhead potentially existed throughout the Guadalupe River system (Skinner, 1962). However, there are no available data that provide an historical or present-day estimate of the population of adults returning to the river during the annual migration. The completion of Almaden and Guadalupe Reservoirs in the mid-1930s and Lexington Reservoir in 1952 restricted steelhead to tributary streams downstream from the dams (Figure 4.5-1). These reservoirs forced steelhead entering the Guadalupe River system to spawn primarily in the lower reaches of the Guadalupe River and in Los Gatos and Ross Creeks. Adult steelhead were observed below the Alamitos drop structure downstream

TABLE 4.6-1. Optimal, Suboptimal, Unacceptable and Lethal Temperature Ranges (°F) for Various Life Stages of Chinook Salmon and Steelhead during the Months They Are Present in the Guadalupe River

Life Stage	Chinook Salmon	Steelhead
Prespawning Adults	August–December	November–April
Optimal	46.4–53.6	44.0–57.0
Suboptimal	53.6–75.2	57.0–65.0
Unacceptable	>75.2	>65.0
Egg Incubation	October–March	January–May
Optimal	41.0–57.2	44.6–53.6
Suboptimal	57.2–60.8	53.6–60.8
Lethal	>60.8	>60.8
Juvenile Rearing	January–June	All Months
Optimal	53.6–64.4	53.6–64.4
Suboptimal	64.4–75.2	64.4–77.0
Lethal	>75.2	>77.0
Juvenile Emigration	February–June	January–July
Optimal	53.6–64.4	44.6–59.9
Suboptimal	64.4–75.2	59.9–66.2
Unacceptable	>75.2	>66.2

Sources: Raleigh et al., 1984, 1986, Rich, 1987, Shapovalov and Taft, 1954, Moyle, 1976.

from Almaden Reservoir in February 1994 (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 1998) and as recently as February 1999.

Although there is no historical account of chinook salmon migrating and spawning in the Guadalupe River, fall-run chinook salmon have occurred in the Guadalupe River during at least the last decade. There is also no historical information available on the number of returning adults during their annual migration. The results of a genetic analysis of these fish

to determine their origin has been inconclusive, but some of the chinook salmon genetic material is consistent with populations from the Sacramento-San Joaquin River system (Nielsen, 1995).

Chinook salmon currently migrate up the Guadalupe River and, to a lesser extent, Los Gatos Creek to spawn. Adult chinook salmon may enter the Guadalupe River from August through December, but most adults arrive from September through November (Table 4.4-1). The salmon spawn from October through December in the river reaches above the influence of tidewater to downstream from the Alamitos drop structure. A fish ladder completed in 1999 provides chinook salmon access to stream reaches above Almaden Lake. The majority of chinook salmon spawn in and around the downtown San Jose area. Eggs hatch after about 2 months, and the young remain in the gravel for several weeks before emerging as fry (Raleigh et al., 1984). Juveniles may be present in the river from January through June, but most outmigrate a month or two after emergence.

Steelhead migrate up the Guadalupe River during November through April (Table 4.4-1) (Shapovalov and Taft, 1954). Spawning may occur during January through May. Because of water temperature constraints, spawning is most likely to occur before April in much of the Guadalupe River system. Eggs hatch during March through early June. Juveniles remain in freshwater for a minimum of 1 year and begin to migrate out to the ocean as smolts from November to May. Smolts are juvenile fish that are migrating downstream and undergoing the physiological changes that enable them to survive in saltwater.

4.6.3 Key Factors Affecting Fish and Fish Habitat

Key factors that affect fish and fish habitat in the Guadalupe River include hydrologic and hydraulic conditions, channel erosion and deposition, river geomorphology, water temperature, SRA cover vegetation, suspended solids and toxic constituents, and species interactions.

4.6.3.1 Hydrologic and Hydraulic Conditions

Hydrologic and hydraulic conditions, or flow, directly determine the area and volume of physical habitat for fish (Orth, 1987, Bain et al., 1988). Habitat components that are affected by hydrologic and hydraulic conditions include water temperature, water depth and velocity, substrate, and SRA cover vegetation. These components are discussed below.

The Guadalupe River is a "flashy" system, meaning that flow increases dramatically in response to rain (Section 4.1, "Hydrologic and Hydraulic Conditions"). Typically, flows peak in winter or early spring in response to peak watershed runoff. Low flow occurs in late summer and early fall, before the onset of seasonal rains. Flows during winter and early spring are usually less than 100 cfs (Appendix 1C). Flows during May through October are usually less than 5 cfs. During the dry summer and fall months, low flow may restrict fish to pools and other areas of the stream where surface water remains. Flow less than 4 to 15 cfs currently results in riffle depths less than 0.6 and 0.8 feet at some locations downstream and within the project area ,potentially impeding passage of steelhead and chinook salmon (Thompson, 1972). Prolonged periods of low surface flow in the Guadalupe River reduce fish survival, growth, and spawning success because of increased competition for living space and food and because of elevated water temperatures, low levels of dissolved oxygen, and impaired passage.

Reservoir construction and operation since the 1930s and 1950s have increased summer flows in some of the stream reaches downstream from the dams relative to flows that occurred prior to 1930 but after substantial agricultural development (Section 4.1, "Hydrologic and Hydraulic Conditions"). The increased flow in these reaches provides additional fish habitat during summer. Water diverted from the Sacramento-San Joaquin River Delta has periodically been discharged into the Guadalupe River at several locations, including Guadalupe Creek near Masson Dam. The increased flow may provide additional fish habitat, but the imported water also may attract anadromous fish species from the Sacramento and San Joaquin Rivers that potentially spawn with populations in the Guadalupe River.

When steelhead and other anadromous fish encounter multiple channels containing flow, they may be attracted to the channel that has higher flow velocity (Powers and Orsborn, 1985, Bell, 1991). However, anadromous fish can also be adversely affected by velocity conditions that may impair their ability to navigate the channel. Steelhead can swim at a sustained velocity of 4.6 feet per second for extended periods of travel, although the optimum migration velocity is less than 4.6 feet per second (Helvey, pers. comm., Thompson, 1972). Average velocities in the project area exceed 4.6 fps during floodflows (Table 4.1-4). Although high average velocity may indicate potential passage impediments, the velocities across the channel may include velocities that allow passage. In addition, floodflows are of short duration (Section 4.1) and would have minimal effect on adult fish passage. Steelhead can swim at a sustained velocity as great as 13.7 feet per second for short periods of time and maintain a maximum speed of 26.5 feet per second for short distances (Helvey, pers. comm.). Although steelhead can navigate in high flow velocity conditions to facilitate jumping obstacles, they would likely avoid areas where velocity exceeds 13.7 feet per second (Helvey, pers. comm.). The availability and location of suitable resting areas also affects their ability to successfully navigate high velocity conditions.

4.6.3.2 Channel Erosion and Deposition

Erosion and deposition of channel bed soil can alter fish habitat conditions that are critical to migration, spawning, feeding, resting, and refuge from predators. Habitat conditions affected by erosion and deposition include the depth of riffles and pools and the occurrence of cover and spawning gravel. Movement of sediments maintains habitat conditions by flushing sand and silt from spawning gravel. The sediment input in the Guadalupe River has been reduced since the 1930s and 1950s, and the river channel appears to be eroding. The presence of coarse-grained material and resistant clay and silt deposits, however, suggests that erosion is limited to local sites or is arrested (Sections 4.2.1, "Sediment Load" and 4.2.2, "Channel Erosion and Deposition"). Because the sediment input to the Guadalupe River has been reduced and the channel is relatively narrow and deep, the stream channel processes of erosion and deposition are reduced relative to the natural processes occurring prior to management of the system by humans. Reduced erosion and deposition processes have potentially reduced fish habitat diversity. Reduced habitat diversity alters native fish species abundance and community composition (Meyer et al., 1999) and has likely similarly affected fish communities and populations in the Guadalupe River.

4.6.3.3 River Morphology

Channel form includes barriers that potentially block upstream migration of anadromous fish. Flow greater than 4 to 15 cfs provides depths over riffles greater than 0.6-0.8 feet, allowing passage of steelhead and chinook salmon (Thompson, 1972). Fish movement in the Guadalupe River has been limited by dams, weirs, stream crossings, pipelines, and other physical features (Section 4.2.3, "River Morphology"). In Segment 3 of the Guadalupe River Project area, exposed gas and sewer lines north of the Old Julian Street Bridge comprise potential barriers to steelhead and chinook salmon migration. Between the downtown San Jose area and the Alamitos drop structure, weirs and stream crossings could affect salmonid migration. Some of the weirs and stream crossings in the Guadalupe River watershed have been modified to promote fish passage, and successful passage of steelhead and chinook salmon has since been documented (Gilroy, pers. comm.). The Alamitos drop structure downstream from Almaden Lake (Figure 4.5-1) historically blocked passage of anadromous fish; however, a fish ladder added in November 1999 now allows passage of steelhead and chinook salmon. This ladder enables anadromous fish to access several miles of habitat in Guadalupe and Alamitos Creeks. Barriers to fish passage also exist upstream from Almaden Lake in Alamitos Creek, including dams, gabions installed in the stream channel, weirs, and culverts. Masson Dam blocks Guadalupe Creek about 1.5 miles upstream from Almaden Lake.

River geomorphology includes substrate and channel form (Section 4.2, "River Geomorphology"). Substrate refers to the composition of the channel bed, including clay, silt, organic detritus, sand, gravel, cobble, and rock. Substrate is an important component of fish spawning and rearing habitat. In general, streams with gravel-cobble substrates support greater diversity and abundance of invertebrates (Waters, 1995). Substrate scouring action in areas where sediments have accumulated increases the diversity of aquatic macroinvertebrate species by increasing their available habitat (Allen and Hasler, 1986, McEwan and Jackson, 1996). The invertebrates are an important source of food for fish, including chinook salmon and steelhead (Waters, 1995). In addition, gravel substrates are needed to support spawning of chinook salmon, steelhead, Pacific lamprey, and other species. Adult steelhead and chinook salmon require relatively clean gravel in which to lay their eggs. The filling of the smaller spaces between gravel particles with silt and sand reduces the flow of water and oxygen to eggs and larvae in the gravel. Fine sediments also can reduce or prevent young fish from emerging after they have hatched. Adequate flow, usually a flow that just fills a natural channel to flood state (Rosgen et al., 1986), is a key factor in maintaining gravels free of fine sediments.

Surveys in 1992–93 determined that gravel substrates in the Guadalupe River are relatively shallow and contain a high percentage of sand- and silt-sized particles (The Habitat Restoration Group, 1994). A high proportion of sand and silt in gravel substrates likely limits the production and diversity of invertebrates and may also limit spawning success for steelhead, chinook salmon, and other fish species. Surveys estimated that approximately 25,400 sf of gravel substrates suitable as spawning habitat for steelhead and chinook salmon occurs in the Guadalupe River between Woz Way and I-880 (U.S. Army Corps of Engineers, 1992). Most of the gravel is upstream from Segments 1 and 2 (Table 4.6-2). Gravel suitable for steelhead and chinook salmon spawning also is present in Guadalupe Creek adjacent to Coleman Avenue and throughout most of Alamitos Creek and Arroyo Calero (White, pers.

comm.). Riffles provide important fish-spawning habitat and food-producing areas, primarily because flow velocity in riffles maintains gravel substrates. The habitat value of runs is generally intermediate between that of pools and riffles, depending on depth, flow velocity, and the resulting substrate conditions. Because of their depth, pools provide cover and moderate daily variability in water temperature. Pools are potentially an important refuge for cool-water species, such as steelhead and chinook salmon, especially during warm months and during upstream migration. Stream reaches with pools and riffles each comprising 50 percent of the channel area are generally thought to provide optimum rearing conditions for juvenile chinook salmon and steelhead (Raleigh et al., 1984, 1986).

Stream surveys conducted in 1986 and 1987 indicate that channel form in the main stem Guadalupe River consists primarily of pools and runs, with riffles constituting less than 10 percent of the stream length (The Habitat Restoration Group, 1991, 1994, 1995). These conditions result from straightening and confining of the natural river channel as the Guadalupe River was converted to a managed floodway (Section 4.2.3, "River Morphology"). USFWS was contacted to determine whether detailed mapping of pools, runs, and riffles is available for the Authorized Project area; however, these specific features had been mapped for only 15 transects in Segment 1 of the Authorized Project. In these transects, the percentage of pools ranged from zero percent to 100 percent, with an average of approximately 70 percent (Schoenberg, pers. comm.). In the HEP analysis, it was assumed that Segments 2 and 3 had the optimum pool percentage for rainbow trout, which equals 35

TABLE 4.6-2. Spawning Gravel Occurrence in the Project Area

Project Segment	Gravel Abundance (sf)
Segment 1	1,000
Segment 2	3,390
Segment 3C Phase 1	500
Segment 3C Phase 2	200
Segment 3A	10,660
Segment 3B	9,700
Reach A Mitigation Site	N/A[a]
Guadalupe Creek Mitigation Site	N/A[a]
Total	25,450

[a] Spawning gravel has not been surveyed.

percent to 60 percent (Schoenberg, pers. comm.). However, from his personal experience with the project, Mr. Steven Schoenberg believes that the downtown reach consisted of 60 percent to 80 percent pools separated by short riffles, although no measurements had been made. This percentage of pool habitat provides less-than-optimal rearing conditions for steelhead and chinook salmon.

Habitat for steelhead and chinook salmon upstream from Almaden Lake on Alamitos Creek, Arroyo Calero, and Guadalupe Creek is considered to be relatively good, based on surveys conducted by USFWS (White, pers. comm.). Pool and riffle habitats are present in

proportions beneficial to steelhead and chinook salmon juveniles on each of these three creeks. The high degree of stream shading, combined with flow releases from the upstream reservoirs in the summer, maintains summer water temperatures below 70 °F in most tributary reaches. The USFWS has indicated that tributary streams could support a fair to moderate anadromous fish population.

4.6.3.4 Suspended Solids and Toxic Constituents

In general, growth and survival of fish and other aquatic organisms may be reduced by the toxic effects of insecticides, metals, nutrients, herbicides, and suspended solids. Toxic materials enter the Guadalupe River from various sources, including mines, agricultural runoff, and municipal discharge (Section 4.3, "Water Quality"). Toxic materials can cause fish mortality within a short period (a few days) or adversely affect growth and development, thereby limiting chances for fish survival (Brown, 1987). Toxic materials can affect all fish life stages and foodweb organisms.

Urban runoff is the primary factor affecting the level of suspended solids and toxic constituents in the Guadalupe River (Section 4.3, "Water Quality"). The San Francisco RWQCB and EPA have listed the Guadalupe River, Alamitos Creek, and Guadalupe Creek as impaired by mercury contamination that resulted from historical Gold Rush-era mining activities for cinnabar deposits (Section 4.3, "Water Quality"). Although adverse effects of urban runoff on fish and aquatic organisms are not apparent in the Guadalupe River, toxic constituents have been identified. The City also posts signs along the Guadalupe River to warn residents against eating fish caught from the river (Section 4.8.1, "Recreation and Public Access"). SCVWD and the San Francisco RWQCB are implementing programs to address pollutant input and protect the biological resources of the Guadalupe River (Section 4.3, "Water Quality").

4.6.3.5 Water Temperature

Water temperature has an important effect on fish growth, reproduction, survival, and migration. This is especially true for steelhead and chinook salmon, which have relatively narrow temperature requirements for each life stage in their development (Table 4.6-1). Existing water temperature conditions based on measured water temperature are discussed below. Baseline water temperature conditions used in the evaluation of project effects, however, required simulation of preproject temperatures for specific flow and weather conditions. The baseline water temperature conditions are presented in Section 5.3.3.4, "Water Temperature," Section 5.6, "Biological Resources–Fish," and in Appendices 1B and 1C.

Based on measured water temperature data available for the Guadalupe River for 1996 and 1997 (Appendix 1A), water temperature conditions generally support steelhead and chinook salmon (Figures 4.6-2 and 4.6-3). The recent improvements in fish passage, discussed above under "River Morphology," have increased the amount of suitable habitat available to fish. Most of the streams shown in Figure 4.5-1 are now accessible to adult steelhead and chinook salmon, including reaches with relatively high frequencies of optimal water temperature conditions as measured by SCVWD from September 1995 through November 1997 (Figures 4.6-2 and 4.6-3). Appendix 1A, "Measured Flow and Water Temperature Data," provides a detailed discussion of measured water temperature

conditions and the relationship of these conditions to the needs of chinook salmon and steelhead life stages.

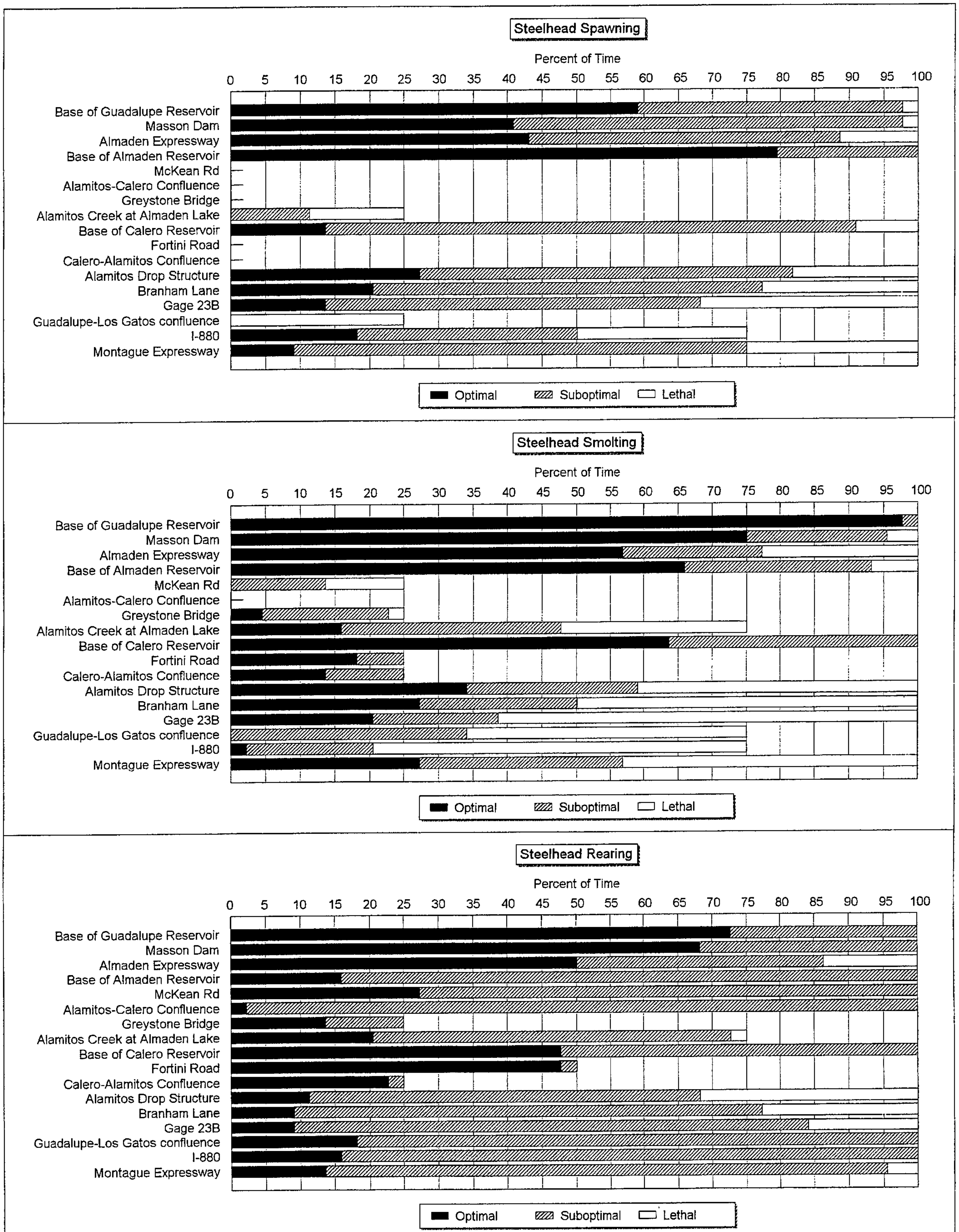
In the Guadalupe River between the Guadalupe-Los Gatos confluence and at I-880 (Figures 4.6-2 and 4.6-3), existing water temperatures for some life stages are frequently in the lethal range. Lethal temperatures mean that conditions would be unlikely to sustain a life stage during the affected period. Water temperatures currently limit successful spawning of steelhead in the main stem Guadalupe River to January and February (Appendix 1A). Water temperatures lethal range for incubating steelhead eggs generally occur in the main stem Guadalupe River by April; successful spawning and incubation may therefore be restricted to tributary streams. Water temperatures conducive to steelhead smoltification, the adaptation required by juvenile anadromous fish to facilitate their migration to the ocean, usually occur during December through March. Water temperatures increase and become progressively detrimental for smoltification from April through June. July and August are the months when water temperatures are highest and most limiting to juvenile steelhead rearing. Water temperatures exceeding 77 °F are considered lethal to rearing steelhead and occur over 40 percent of the time in measured data recorded between Almaden Lake and downtown San Jose at I-280. Temperatures are cooler downstream from the Guadalupe-Los Gatos confluence and rarely exceed the lethal threshold.

In September and October, water temperatures in the Guadalupe River are warm and are usually lethal to incubating chinook salmon eggs. Lethal water temperatures for eggs occur during early adult chinook salmon migration and extend through October and sometimes into November. From December through February, water temperatures cool and support survival and development of incubating eggs. Water temperature conditions are generally adequate for rearing from February through May or June. Juvenile chinook salmon usually outmigrate before the end of June. Temperatures for chinook salmon rearing may be lethal in the Guadalupe River over warm periods during April through June.

4.6.3.6 Shaded Riverine Aquatic Cover

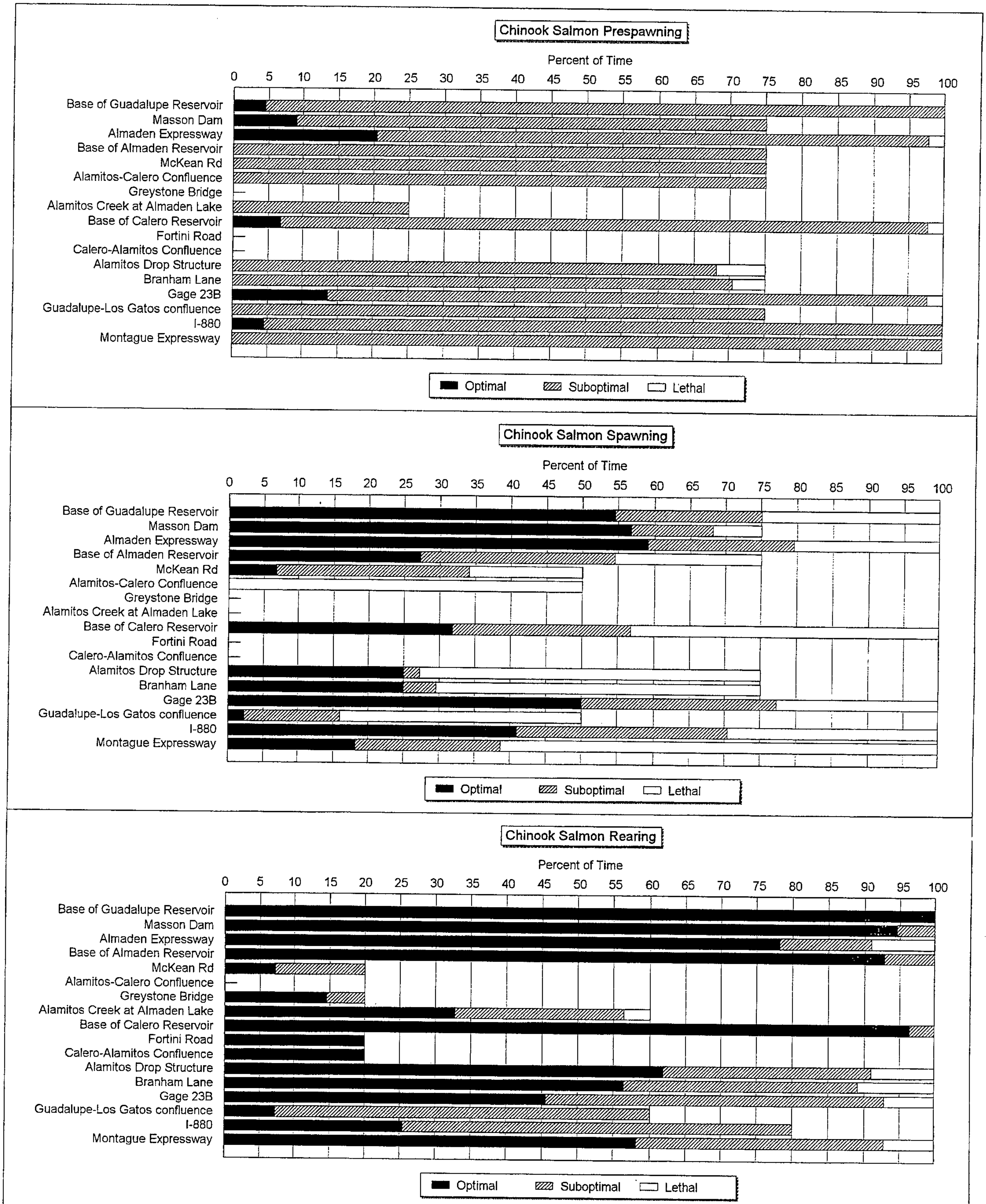
SRA cover vegetation is composed of overhead riparian vegetation and instream cover, including tree roots, boulders, woody material, and undercut banks. SRA cover vegetation provides fish with protection from predators, increases streambank stability, increases habitat complexity, provides habitat for food organisms, and provides shade. Shaded stream surface is an indication of the amount of overhead cover. Segments 1, 2, and 3 are relatively well shaded, with shade over 20 percent to 70 percent of the stream surface. Shade in the Reach A mitigation site and Guadalupe Creek mitigation site covers only 5 percent to 30 percent of the stream surface. A substantial amount of shade from SRA cover vegetation is present on Alamitos Creek and on Arroyo Calero; shade approaches 70 percent to 90 percent at some locations on these creeks.

Under existing conditions, Guadalupe Creek, Segments 1, 2, and 3, and Reach A have 19,055 lf of bank supporting SRA cover vegetation and 1,798 lf of armored bank (Section 4.2.3, "River Morphology"). Instream cover is a component of SRA cover. Based on habitat needs of steelhead (Raleigh et al., 1984), existing instream cover is nearly optimal for adult and juvenile steelhead (U.S. Army Crops of Engineers, 2000C).



Notes: Values represent percentage of temperature measurements at a given station that fall within the threshold temperatures for each suitability category. Data collected in 1996-97. Incomplete bars represent missing data.

Figure 4.6-2 Existing Water Temperature Suitability for Steelhead Life Stages at 17 Locations in the Guadalupe River System



Notes: Values represent percentage of temperature measurements at a given station that fall within the threshold temperatures for each suitability category. Data collected in 1996-97. Incomplete bars represent missing data.

Figure 4.6-3 Existing Water Temperature Suitability for Chinook Salmon Life Stages at 17 Locations in the Guadalupe River System

4.6.3.7 Species Interactions

Several nonnative fish species, including largemouth bass and sunfishes (*Lepomis* ssp.), were introduced into California streams before 1900. Several of these species occur in the Guadalupe River and compete with native species for food and cover. Nonnative species also may prey on eggs, larvae, and juveniles. The upstream reservoirs provide habitat that supports populations of introduced species. Loss of stream habitat, combined with increased populations of nonnative species, is likely to have been detrimental to native species populations. When migratory species, such as steelhead and chinook salmon juveniles, enter a system with human-made structures, they can become disoriented and stressed by flow and water temperature conditions associated with dams, weirs, and impoundments. When stressed, they are more vulnerable to predation by the nonnative fish.

4.7 Land Use and Planning

The study area for the evaluation of land use and planning includes Segments 1, 2, 3, and the Reach A mitigation site.

4.7.1 Land Use

The City has jurisdiction over and responsibility for the development of areas adjacent to the Guadalupe River within its urban service area. The Guadalupe River Project is thus subject to the San Jose General Plan (1994) and to the Guadalupe River Park Master Plan (City of San Jose, 1989). Both are described in Section 1.6, "Other Pertinent Studies and Documents," and below in Section 4.7.2, "Plans and Policies."

Land use in the study area includes industrial, commercial, residential, and open-space uses. Specific land use designations have changed in some parts of the project area since the Authorized Project was evaluated in the 1985 EIS. In general, the area has become increasingly urbanized and has undergone a shift from industrial development to office and other commercial uses. In the past 5 years, the City has added more than 2 million sf of commercial space and almost 3,000 residential units to its central planning area, where the study area is located (City of San Jose, 1999).

The San Jose General Plan designates the Guadalupe River corridor, including the river, riverbanks, and river trails, as public park/open space (City of San Jose, 1994). Currently, Segments 1 and 2 are surrounded by public park/open space. Existing land uses along Segment 3A between Coleman Avenue and New Julian Street include a combined industrial/commercial zone and an airport approach zone; in addition, commercial office buildings and a Pacific Gas and Electric Company substation are located on the east side of the Guadalupe River in Segment 3A. Existing land uses along Segment 3B between New Julian Street and Park Avenue include combined industrial/commercial, general commercial, and office developments, as well as public and quasi-public lands. The River Street area once supported a residential development, but these houses have been removed (U.S. Army Corps of Engineers, 1985).

Offsite mitigation areas include Reach A of the Guadalupe River and Guadalupe Creek. Reach A is located between Airport Boulevard and Guadalupe Parkway; it borders San Jose International Airport to the west and the Guadalupe Parkway to the east. The Guadalupe

Creek mitigation site is between Masson Dam and Almaden Expressway. Land adjacent to Guadalupe Creek is currently designated as open space and is surrounded by residential land uses.

4.7.2 Plans and Policies

4.7.2.1 San Jose General Plan

The San Jose General Plan (1994) seeks to balance the community's need for flood protection with the need to preserve San Jose's remaining riparian corridors. The General Plan directs the City to cooperate with SCVWD to improve flood protection facilities.

4.7.2.2 Guadalupe River Park Master Plan

The Guadalupe River Park Master Plan (1989) proposes the development of 205 acres along the Guadalupe River in downtown San Jose as a linear urban park. Proposed development includes enhancements to the Authorized Project, such as a river walk, access points, and riparian vegetation and habitat. The 3-mile segment of the Guadalupe River covered by the Guadalupe River Park Master Plan includes Segment 1, Segment 2, and Segments 3A, 3B, and 3C. Reach A and Guadalupe Creek are outside the Guadalupe River Park Master Plan area.

4.8 Recreation, Public Access, and Visual/Aesthetic Resources

This section discusses recreational use of and public access to the Guadalupe River and Guadalupe Creek downstream from Masson Dam. It also addresses the visual/aesthetic resources provided by these streams. The study area for the evaluation of recreation, public access, and visual/aesthetic resources includes Segments 1, 2, and 3.

4.8.1 Recreation and Public Access

In downtown San Jose, the Guadalupe River offers surrounding residents an open-space corridor of riparian vegetation and a system of constructed trails, informal pathways, and informal neighborhood open-space areas. The study area overlaps an existing city park, the Guadalupe River Park, that will be completed when the flood protection project has been completed. The riparian corridor is accessible to the public by constructed trails and by informal pathways (Figure 3.4-9). On the west side of the Guadalupe River, constructed trails are located between I-880 and Coleman Avenue, between St. John Street and Santa Clara Avenue, and between Park Avenue and Woz Way. East of the river, constructed trails are located between Park Avenue and Woz Way. In some areas, informal pathways also support recreational use; in other areas, parking lots, buildings, and riparian vegetation limit travel along the river. In the study area, the river accommodates activities that depend on water, such as fishing and recreational boating, as well as activities that are enhanced by water, such as walking and nature viewing.

Although there are no boat launch ramps, limited recreational boating occurs on the Guadalupe River. During moderate to high flows, the river is navigable by small watercraft, such as canoes and kayaks, from the dam above Blossom Hill Road to its mouth at Alviso (Western Water Canoe Club, 1997). Boating opportunities are limited during low-flow conditions from May to November. Preproject facilities that restrict watercraft passage

during low-flow conditions include the USGS weir located near the New Julian Street Bridge and the natural gas and sewer pipelines that cross the river near St. John Street Bridge. Within Guadalupe River Park, city policy prohibits boats longer than 16 feet, windsurfers, surfboards, air mattresses, and inner tubes (City of San Jose, 1996).

Some fishing also occurs on the Guadalupe River in the downtown area. The City generally discourages human consumption of fish caught in the Guadalupe River and other area streams because the fish may contain trace amounts of heavy metals. Signs warning the public not to eat fish caught in the area are posted throughout Guadalupe River Park. Fishing use of the Guadalupe River probably totals no more than about 60 visits per year (Helmke, pers. comm.).

Other recreational opportunities along the river include nature viewing and walking. Recreational use along Segments 1 and 2 has been enhanced by the construction of trails and stairways. By contrast, a lack of formal trails limits the travel of recreationists along Segments 3A and 3B. One formal recreational facility is located along this portion of the river, the Gregory Tot Lot near Park Avenue. There are also top-of-bank trails on the east and west banks of the Woz Way to Park Avenue bypass reach. The Guadalupe River Park Master Plan (1989), described in Section 3.6.3, "Plans and Policies," encompasses plans for several recreational facilities in Segments 3A and 3B, including a river walk, additional trail access, and natural habitat; however, these facilities have not yet been constructed.

Guadalupe Creek is also used for informal recreational activities, although access to the creek is restricted by fences and gates. Most recreation on Guadalupe Creek occurs on levee maintenance roads. Popular activities include walking, running, wildlife viewing, and biking.

4.8.2 Visual/Aesthetic Resources

The Guadalupe River provides a distinct band of vegetation through densely urbanized portions of downtown San Jose. The vegetation serves as a visual focal point; residents consider the natural riparian greenbelt along the river an attractive amenity that helps to offset the impacts of urbanization on the area's visual/aesthetic quality. Because of the river's somewhat meandering course and its urban setting, as well as limitations on river access, the full length of the river is visible only from area skyscrapers and from the air.

The Guadalupe Creek corridor is largely an open-space area. Small clusters of riparian vegetation and individual trees and shrubs are located immediately adjacent to the creek. Vegetation in the area between the riparian corridor and the stream's levees consists primarily of ruderal grassland. Percolation ponds located within the Guadalupe Creek corridor provide additional visual/aesthetic relief to the area.

4.8.3 Plans and Policies

4.8.3.1 San Jose General Plan

The San Jose General Plan (City of San Jose, 1994) includes policies for parks and recreation and for trails and pathways. In general, these policies are intended to enhance the livability of the urban environment by providing parks and a network of trails and pathways and by preserving significant natural, historic, scenic, and other open-space resources.

4.8.3.2 Guadalupe River Park Master Plan

The Guadalupe River Park Master Plan (City of San Jose, 1989) was designed to be consistent with the goals of both the city and county general plans regarding the provision of public access, the creation of water features, and the development of open space. The objectives of the Guadalupe River Park Master Plan include:

- Providing open space along the Guadalupe River for recreation and relaxation of workers and residents in an urban environment
- Enhancing the Guadalupe River as both a valuable riparian habitat and a natural resource to be enjoyed by the citizens of San Jose and other communities
- Developing a linear urban park that can provide opportunities for construction of both private and public facilities
- Using designs and materials that will accommodate flood protection in the Guadalupe River without restricting human access to the river itself
- Limiting the erection of concrete barriers within the channel and along its banks

4.8.3.3 Basin Plan of the San Francisco Regional Water Quality Control Board

The Basin Plan of the San Francisco Bay Regional Water Quality Control Board (California Regional Water Quality Control Board and San Francisco Bay Regional Water Quality Control Board, 1995) was written to maintain water quality in the San Francisco Bay area. It identifies beneficial uses of surface waters, with the ultimate goal of protecting area waters and achieving high water quality. It identifies both water-dependent and water-enhanced recreation as beneficial uses of the Guadalupe River.

4.9 Transportation and Traffic

The study area for the evaluation of transportation and traffic is the existing road network in the vicinity of Segments 1, 2, and 3; Reach A; and the Guadalupe Creek mitigation site, including roads that would be traveled by haul trucks during project construction. This section also provides information on existing traffic volume on affected roads.

4.9.1 Existing Roads and Bridges

Segments 1, 2, and 3 and Reach A are located on the northwest edge of downtown San Jose, southwest of San Jose International Airport. Major surface streets in the project area include Santa Clara Avenue, New Julian Street, Old Julian Street, St. John Street, Coleman Avenue, Park Avenue, and Woz Way. Old Julian Street has been closed. The most recent San Jose General Plan includes a list of streets designated as major collectors for the year 2020. Julian Street and Santa Clara Street, which are both crossed by the proposed bypass system, are classified as arterials in the San Jose General Plan (City of San Jose, 1994). Freeways that traverse the area include I-880, I-280, and State Route 87, currently being upgraded to freeway standards. Table 4.9-1 gives traffic volumes for major roads that would be used as haul routes. The study area would also cross UPRR tracks No. 3 and No. 4. The tracks intersect the Guadalupe River between Old Julian Street and Coleman Avenue in the northern portion of the project site.

Material excavated from Segment 3 and the bypass would be hauled to disposal sites on Zanker Road and Newby Island. To reach the Zanker Road disposal site, trucks would travel on New Julian Street to the Guadalupe Parkway, north to Hedding Street, east to North First Street, north to I-880, north on I-880 to State Route 237, and then west to Zanker Road and the disposal site. To reach the Newby Island disposal site, trucks would follow the same route to I-880; they would exit I-880 at Dixon Landing Road and then travel west to the disposal site. Estimated daily traffic volumes on the haul routes to both disposal sites are given in Table 4.9-1.

Construction on the Guadalupe Creek mitigation site would also require that excavated material be hauled to either the Zanker Road or Newby Island disposal site. Haul trucks leaving the Guadalupe Creek site would follow Coleman Avenue east to the Almaden Expressway and would travel north on the Almaden Expressway, north on State Route 87

TABLE 4.9-1. Estimated Daily Traffic Volumes on Major Routes in the Vicinity of the Guadalupe River Project with the Bypass System Alternative

Street, Road, Expressway, or Freeway Name	Estimated Traffic Volume (vehicles per day)
I-880 from North 1st Street to State Route 237	122,000
I-880 from State Route 237 to Dixon Landing Road	146,000
State Route 237	88,000
State Route 87	20,000
Guadalupe Parkway	66,000
Almaden Expressway	72,400
Coleman Avenue	153,000
Dixon Landing Road	15,330
Hedding Street	11,000
New Julian Street	12,000
North First Street	31,300
St. John Street	5,000
West Santa Clara Street	24,000
Zanker Road	3,800

Source: City of San Jose, 1998.

and then north on I-880. From I-880, trucks would proceed as described above to the Zanker Road disposal site or the Newby Island disposal site.

4.9.2 Parking

Several public parking lots are located in the vicinity of the study area. Most of these lots serve visitors to the Guadalupe River Park and adjacent institutions, including the Technology Center of Silicon Valley, the Children's Discovery Museum, and the San Jose Convention Center. Several additional parking lots for private businesses are located in the vicinity of the project.

The San Jose Arena is also located in the vicinity of the project. During major events, it can create demand for 5,000 to 6,000 vehicles. Although a large portion is accommodated by lots on the east side of the Guadalupe River, the majority of that demand is accommodated by parking lots on the west side of the river.

4.10 Air Quality

This section describes local topography and climate, applicable Federal and State ambient air quality standards, existing air quality conditions, and applicable air quality management programs. Because most potential effects of the Bypass System Alternative or Refined Bypass System Alternative would occur in San Jose, the study area is the Santa Clara Valley portion of the San Francisco Bay Area Air Basin (SFBAAB).

4.10.1 Topography and Meteorology

The study area is located in the Santa Clara Valley, which is bounded by San Francisco Bay to the north and by mountains to the east, south, and west. Temperatures in the valley are warm on summer days and cool on summer nights, and winter temperatures are fairly mild. At the northern end of the valley, mean maximum temperatures are in the low 80s during the summer and the high 50s during the winter; mean minimum temperatures range from the high 50s in the summer to the low 40s in the winter. Farther inland, where the moderating effect of the bay is not as strong, temperature extremes are greater.

Winds in the valley are greatly influenced by the terrain, resulting in a prevailing flow that roughly parallels the valley's northwest-southeast axis. A north-northwesterly sea breeze typically flows through the valley during the afternoon and early evening, and a light south-southeasterly wind occurs during the late evening and early morning. In the summer, the southern end of the valley becomes a convergence zone when air flowing inland from Monterey Bay is channeled northward into the southern end of the Santa Clara Valley and meets the prevailing north-northwesterly winds.

Wind speeds are highest in the spring and summer and lowest in the fall and winter. Mild winds are common in all four seasons, and summer afternoons and evenings tend to be breezy. Strong winds are rare and are associated mostly with winter storms.

4.10.2 Federal and State Ambient Air Quality Standards

Both the Federal Government and the State of California have established air quality standards for ambient concentrations of several key pollutants (Table 4.10-1). For some pollutants, separate standards have been set for different time periods. Most standards were set to protect public health; however, for some pollutants, standards were based on other values, such as protection of crops, protection of materials, or avoidance of nuisance conditions. NAAQS for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and PM10 specify short-term (less than 24 hours) concentrations that may be exceeded no more than once per year. NAAQS for ozone specify concentrations that may be exceeded no more than 3 days in a 3-year period. NAAQS also set annual concentrations for NO_2, SO_2, CO, and PM10 that may never be exceeded. California ambient air quality standards (CAAQS) represent concentrations that should never be exceeded.

TABLE 4.10-1. Ambient Air Quality Standards Applicable in California

Ambient air quality standards are established by the State and Federal Governments for key pollutants. The California standards represent concentrations that should never be exceeded.

			Standard, as parts per million		Standard, as micrograms per cubic meter		Violation Criteria	
Pollutant	**Symbol**	**Average Time**	**California**	**National**	**California**	**National**	**California**	**National**
Ozone	O_3	8 hours	N/A	0.08	N/A	160	N/A	If 3-year average of annual third-highest daily 8-hour maximum exceeds standard
		1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
Nitrogen dioxide	NO_2	Annual average	N/A	0.053	N/A	100	N/A	If exceeded
		1 hour	0.25	N/A	470	N/A	If exceeded	N/A
Sulfur dioxide	SO_2	Annual average	N/A	0.03	N/A	80	N/A	If exceeded
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	N/A	655	N/A	N/A	N/A
Inhalable particulate matter	PM10	Annual geometric mean	N/A	N/A	30	N/A	If exceeded	N/A
		Annual arithmetic mean	N/A	N/A	N/A	50	N/A	If exceeded
		24 hours	N/A	N/A	50	150	N/A	If exceeded on more than 1 day per year
Fine particulate matter	PM2.5	Annual arithmetic mean	N/A	N/A	N/A	15	N/A	If spatial average exceeded on more than 3 days in 3 years
		24 hours	N/A	N/A	N/A	65	N/A	If exceeds 98th percentile of concentrations in a year

Notes:
All standards are based on measurements at 25° C and 1 atmosphere pressure. National standards shown are the primary (health effects) standards.
N/A = not applicable.

Air quality in the SFBAAB is the responsibility of the BAAQMD. CO, ozone, and PM10 are of greatest concern for the Guadalupe River Project, in part because of the SFBAAB's nonattainment status for ozone and PM10, and also because constructing the project would result in the emission of these pollutants.

The environmental effects of elevated CO, ozone, and PM10 concentrations are well known. CO, a product of incomplete combustion, interferes with oxygen transport to body tissues. Ozone is a component of photochemical smog. Its major effects include irritation of the respiratory system and eyes and reductions in plant growth and crop yields. Particulate matter contributes to a wide range of pollution effects, such as reduced visibility, respiratory system irritation, corrosion of materials and structures, and economic effects related to soiling of materials.

4.10.3 Existing Air Quality Conditions

Ambient air quality data are routinely measured and reported by California's air pollution control districts and by the California Air Resources Board (ARB). These data are summarized by ARB in quarterly and annual reports. The monitoring station closest to the study area is the 4th street station in San Jose (Table 4.10-2).

4.10.3.1 PM10

Recent data collected at the 4th Street station show that State 24-hour PM10 standards were exceeded between two and seven times per year in 1994, 1995, 1996, 1997, and 1998. No violations of the Federal PM10 standards occurred in San Jose during the past 5 years.

4.10.3.2 Carbon Monoxide

The monitoring data show no violations of the CO standards during the 5 most recent years for which data are available.

4.10.3.3 Ozone

The 4th Street station recorded exceedances of the State ozone standard during 4 of the 5 most recent years for which data are available. As many as 14 violations per year occurred during this period.

4.11 Noise

The study area for the evaluation of noise is the area encompassed by and in the vicinity of Segments 1, 2, and 3; the Reach A mitigation site; and the Guadalupe Creek mitigation site. This section identifies local noise regulations for the study area. Appendix 1E provides background information on environmental acoustics and Federal and State noise regulations.

4.11.1 Noise Regulations

Jurisdictions in California are required to have noise elements in their general plans; the noise elements are used as planning guides to ensure that noise levels are compatible with adjacent land uses. Most jurisdictions also have noise ordinances, which serve as enforcement mechanisms for controlling noise.

TABLE 4.10-2. Summary of Air Quality Monitoring Data for Location near Study Area
Air quality monitoring data gathered in the study area indicate that the PM10 and ozone standards have been exceeded.

				Year				
Monitoring Station	**Parameter**	**Federal Standard**	**California Standard**	**1994**	**1995**	**1996**	**1997**	**1998**
PM10 (g/m^3) San Jose - 4th Street	Annual geometric mean	50 g/m^3	30 g/m^3	26	21	22	23	22
	24 hours - 2nd highest	150 g/m^3	50 g/m^3	86	58	67	68	54
Carbon monoxide (ppm) San Jose - 4th Street	Peak-hour value	35 ppm	20 ppm	12	9	9	10	N/A
	Peak 8-hour value	9 ppm	9.0 ppm	8.9	6.1	7.0	6.1	6.3
	Days above standard[a]			0	0	0	0	0
Ozone (ppm) San Jose - 4th Street	1-hour maximum	0.12 ppm	0.09 ppm	0.11	0.13	0.11	0.09	0.15
	Days above State standard			2	14	5	0	4

[a] Days above standard means days with one or more exceedance of the 8-hour CO standard.
g/m^3 = grams per cubic meter.
ppm = parts per million.
Source: California Air Resources Board, 1999.

To avoid significant adverse health effects, the City has established the following objectives as acceptable noise levels: 55 L_{dn} (average day/night noise level in decibels) as the long-term exterior noise level, 60 L_{dn} as the short-term exterior noise level, 45 L_{dn} as the interior noise level, and 76 L_{dn} as the maximum exterior noise level. To achieve these noise objectives, the City of San Jose requires that new residential development employ appropriate site and building design and incorporate noise attenuation measures in building construction. However, the noise element of the San Jose General Plan (City of San Jose, 1994) recognizes that the exterior noise level goals will probably not be attained in the vicinity of San Jose International Airport and in the downtown core area during the time frame of the current General Plan.

4.11.2 Noise-Sensitive Land Uses

No noise-sensitive land uses have been identified in or in the vicinity of the study area.

4.12 Public Services and Utilities

The study area for the evaluation of public services and utilities includes Segments 3A and 3B. Basic infrastructure in the study area includes sewer, water, storm drains, gas and electrical lines, telephone, and cable television. These services are conveyed to the public via underground pipes, conduits under bridges, and overhead wires on both sides of the Guadalupe River. Most of this infrastructure crosses the river at existing bridges, but some services cross the river via borings or elevated crossings not associated with bridges. For instance, a 30-inch gas main crosses the river north of the St. John Street Bridge and a 12-kilovolt transmission line angles northward from the west bank of the Guadalupe River at its confluence with Los Gatos Creek to connect with the Pacific Gas and Electric Company

substation on the east bank of the river near Coleman Avenue. The City is responsible for providing sanitary sewer service and maintaining the storm drain system. Pacific Gas and Electric Company maintains electrical and gas lines. The San Jose Water Company provides water and maintains waterlines. Pacific Bell maintains the telephone infrastructure, and AT&T Cable maintains the cable television system.

The Corps and SCVWDs' construction plans provide the locations of all public service facilities along with telephone numbers for the party responsible for each of these facilities. The Corps and SCVWD require that contractors call Underground Service Alert so that the service providers can verify the location and elevation of existing utilities prior to construction. The construction plans also call for contractors to plug and cap all exposed ends of sewer, storm drain, water, gas, and cable television lines that will be vacated and to specify which features will be rerouted.

Additional public services in the study area include fire and police protection. Fire protection is provided by the City of San Jose Fire Department, which has four facilities near the project area. Police protection is provided by the San Jose Police Department. Response time for both fire and police to the project area is less than 5 minutes.

4.13 Hazards and Hazardous Materials

The study area for the evaluation of hazards and hazardous materials includes Segments 3A and 3B and the Reach A mitigation site.

4.13.1 Regulations

Federal, State, and local legislation regulates the proper use, disposal, and cleanup of hazardous materials.

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as the Superfund Act) of 1980 (Public Law 96-510) is intended to protect the public and the environment from the effects of prior hazardous waste disposal and new hazardous materials spills. CERCLA provides funds to compensate victims and to decontaminate the environment. The Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99-499) amends some provisions of CERCLA and provides for a Community Right-to-Know program.

The EPA administers the Resource Conservation and Recovery Act (RCRA) of 1976 (Public Law 94-580), along with the Hazardous and Solid Waste Amendments of 1984. This legislation provides the principal regulation for the storage, transportation, and disposal of both solid and hazardous waste. RCRA imposes requirements for reporting and permitting activities involving hazardous waste, and exercises operational control over those who generate, treat, store, transport, or dispose of hazardous waste.

Various State laws also govern hazardous materials and hazardous waste management. State hazardous waste regulations are primarily contained in the California Code of Regulations, Title 22, Division 4, Environmental Health. The Hazardous Waste Control Law lists hundreds of hazardous and potentially hazardous chemicals. In addition, this code establishes criteria for identifying hazardous materials; regulates the storage, transport, and disposal of hazardous

wastes; and identifies hazardous wastes that cannot be disposed of on land. The California Department of Toxic Substances Control (DTSC), through Division 20, Chapter 6.8 of the California Health and Safety Code, is empowered to provide response authority for releases of hazardous substances, including spills and hazardous waste disposal sites that pose a threat to the public health or the environment. Water quality regulations, developed from the Porter-Cologne Water Quality Control Act, are designed to protect the quality of waters in California. Title 23 of the California Code of Regulations contains the water quality regulations pertinent to environmental contamination. The San Francisco RWQCB and SCVWD administer these regulations in the San Jose area.

The City has adopted a municipal Hazardous Materials Handling and Storage Ordinance (HMSO) addressing the proper storage of hazardous materials in underground storage tanks. The HMSO defines materials requiring regulation, sets standards for existing facilities and the closure of out-of-service facilities, and establishes criteria for reportable discharges. In addition, the HMSO establishes a system of inspections and permits and requires qualifying facilities to prepare a Hazardous Materials Management Plan and a Hazardous Materials Inventory Statement. The HMSO regulates both new and existing facilities. The San Jose Fire Department is the administering agency for the HMSO.

4.13.2 Known Sites

Portions of the Guadalupe River corridor cross areas that have experienced a range of past and current industrial and commercial uses, including manufacturing and the underground storage of fuel. As a result, hazardous wastes exist in the project area and could be present during construction and operation of the Bypass System Alternative. As indicated in Section 4.3.2, "Toxic Constituents," these toxic constituents include lead, copper, zinc, mercury, and nickel. Effects on humans would depend on the amount and concentration of contaminants, the pathways by which the contaminants reach potential receptors, the amount of exposure, and the sensitivity of the receptors.

Several investigations have been conducted to examine the extent of hazardous waste in the Guadalupe River corridor and surrounding areas, including a Phase 1 EA and Phase 2 EA, a literature search, and field reconnaissance (U.S. Army Corps of Engineers, 1991b, CH2M HILL, 1995). These investigations revealed 26 sites within one-half mile of the Guadalupe River Project. Of these sites, 23 have been remediated, cleaned up, or have obtained verification from the San Francisco RWQCB that no additional cleanup work is necessary (Table 4.13-1). Three sites – the UPRR rail yard, the Perez property, and the Sobrato property, former location of the FMC plant – are in close proximity to one another and are on private property (Figure 4.13-1). These sites are also adjacent to Segment 3A.

The UPRR property is located on both sides of the Guadalupe River in Segment 3A. The portions of the property where SCVWD is considering acquiring easements are located immediately adjacent to the Guadalupe River. There are two active railroad bridges, UPRR No. 3 and No. 4. The UPRR property was contaminated by a 2,000-gallon underground gasoline storage tank, located about 1,300 feet west of the river, which was removed from the UPRR property in 1988, and by a 750-gallon underground waste oil tank, located about 500 feet west of the river, which was removed in 1989. Evaluation and interpretation of the analytical data for the UPRR property indicate that:

TABLE 4.13-1. Status Summary for Hazardous Material Areas Within Guadalupe River Flood Protection Project

Area No.*	Area Identification	Hazardous Material	Status **
Closed/Remediated Areas			
1, 2	Regent Street	Household debris, TPH	Debris was removed and construction was completed. No additional work was considered necessary.
3	Village Court	Cu, Pb, Ni, PNAs, TPH	Contaminated soil was removed in September 1993. Confirmation Sampling Report was approved by RWQCB on May 31, 1994. No additional work was considered necessary.
4	Hobson Street	Metals	Suspected soil contamination was not confirmed. No additional work was considered necessary.
5	Empire Street	Metals, solvents	Suspected soil contamination was not confirmed. No additional work was considered necessary.
6	Pool Cleaning Supply	Se, TPH	UST was removed in April 1994. RWQCB granted UST closure in March 1995. No additional work was considered necessary.
7	Coleman Substation	Metals	This area is included as part of Area 22 Guadalupe River embankment and sediment.
8	Auto Repair	TPH, metals	Area is outside flood protection project. No additional work was considered necessary.
10	Channel banks between Coleman Avenue and Old West Julian Street	Metals	This area is included as part of Area 22 Guadalupe River embankment and sediment.
11	Howard Street	TPH, metals	This area is included as part of Area 22 Guadalupe River embankment and sediment.
12	Howard Street	TPH, metals	Owner removed contaminated soil in March 1992. RWQCB granted UST closure in November 1993. No additional work was considered necessary.
15	West Santa Clara Street	TPH, metals	Additional investigation performed in August 1994 showed soil to be inert. No additional work was considered necessary.
16	Auto Repair	TPH, VOCs, metals	Elevated TPH and metal concentrations were detected. Additional investigations by owners did not confirm that the levels detected were significant and showed that the soil within the project limits classifies as inert. RWQCB concurred with the Third Party consultant on their classification of the soil with TPH contamination as inert and requiring no further action in May 1995. No further work was considered necessary.
17	Manning-Marsh Property	TPH	Remediation of groundwater contamination is now complete.
18	Former Corp. Yard	Pb	Additional investigation performed in August 1994 showed upper 3 feet in area to be excavated may be hazardous waste. Excavation of this material is complete. Confirmation soil sampling is enclosed for review and comment by RWQCB.

TABLE 4.13-1. Status Summary for Hazardous Material Areas Within Guadalupe River Flood Protection Project

Area No.*	Area Identification	Hazardous Material	Status **
Closed/Remediated Areas			
19	Former Auto Machine Shop	TPH	Additional investigation performed in August 1994 showed soil to be inert. No additional work was considered necessary.
20	Arena Properties	TPH, VOCs, metals	Area is outside flood protection project. No additional work was considered necessary.
21	Newspaper	VOCs	Area is outside flood protection project. No additional work was considered necessary.
22	Guadalupe River embankment soil and sediments	TPH, metals	Soil characterization report was submitted to RWQCB on December 15, 1994. RWQCB concurred with the findings of the report in January 1995. No additional work was considered necessary. More recent reports indicate that mercury is a regional problem and should be addressed.
23	Hedding Street	Debris, Pb, Cu, Ni	Contaminated soil was removed in November 1993. Confirmation Sampling Report was approved by RWQCB on May 31, 1994. No additional work was considered necessary.
24	North River Street and St. James Street	TPH, metals	Suspected soil contamination was not confirmed. No additional work was considered necessary.
25	Retaining Wall alignment near San Jose Water Company and Caltrans right-of-way	TPH	Suspected soil contamination was not confirmed. No additional work was considered necessary.
Remediation Areas			
9	SPPC (Rail yard)	PNAs, metals	The portion of this area located within the river channel is included as part of Area 22 Guadalupe River embankment and sediment. Heavy metals require removal of soil.
13	Sobrato (Former FMC ordinance plant)	Cu, Pb, VOCs, TPH	Right-of-way for bypass is clear, but other areas may need soil removed.
14	New West Julian Street	TPH, metals	This area is included as part of Area 22 Guadalupe River embankment and sediment.

* Area corresponds with data in CH2M HILL, 1995.
** Status as determined from SCVWD memorandum.

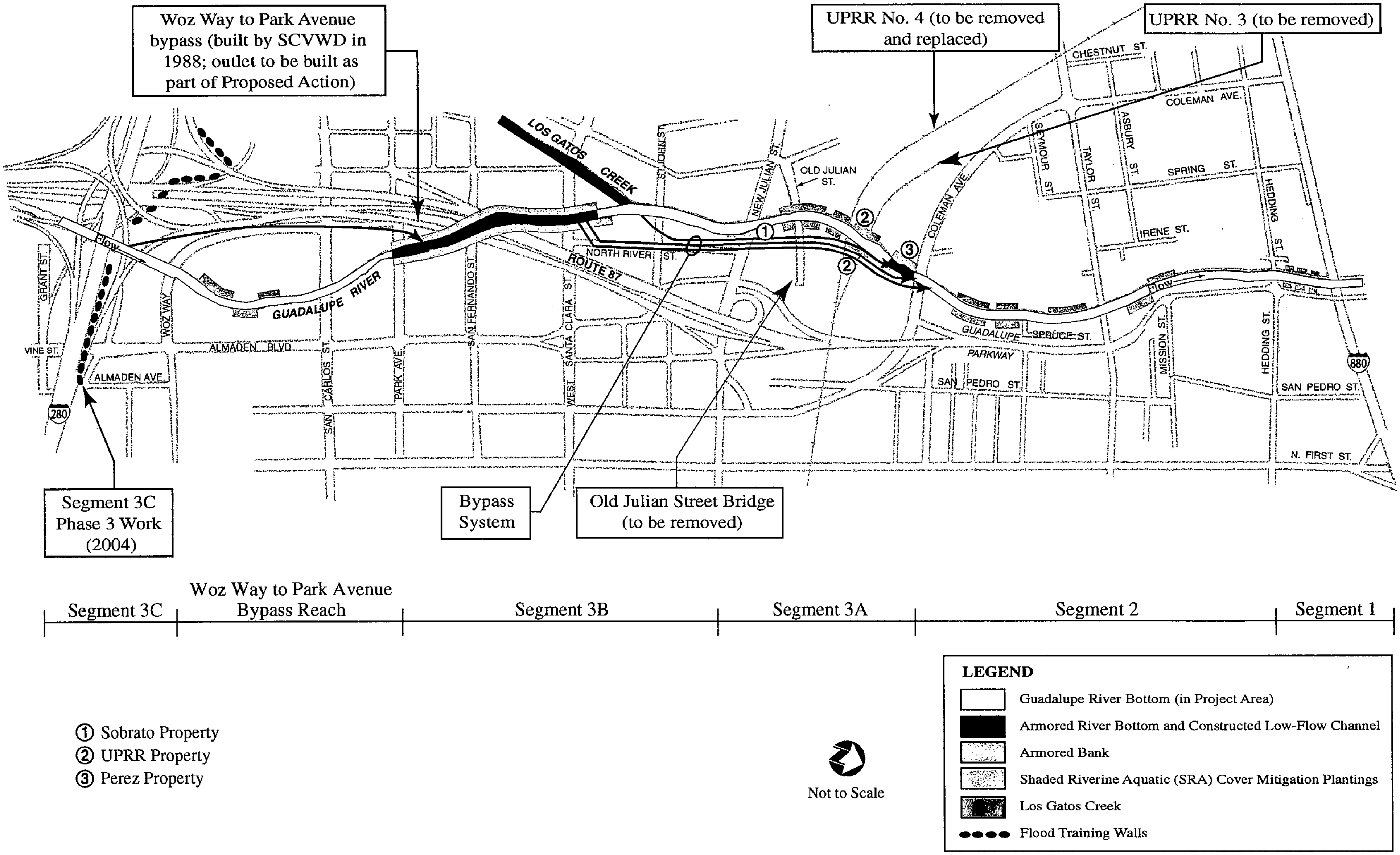
- Soil on the property east of the Guadalupe River along the proposed project footprint contains heavy metals including arsenic, barium, chromium, and lead. No volatile organic carbons (VOCs) were discovered, though the pesticide DDE was found in one sample and asbestos was found in a pipe on the ground surface. Groundwater samples did not contain VOCs, SVOCs, lead, TPHd, and TRPH.
- Soil on the property west of the Guadalupe River contains heavy metals including arsenic, chromium, and copper. No VOCs were discovered, though three pesticides were reported including 4,4′ DDE, 4,4′ DDT, and endrin. (Kleinfelder, 2000).
- No soil is classified as a Federal hazardous waste under CERCLA (CH2M HILL, 1995).

The Sobrato property is located at 333 New Julian Street on the eastern bank of the Guadalupe River between New Julian Street and the UPRR property in Segment 3A. FMC Corporation has been identified as the responsible party for onsite hazardous materials. Environmental investigations began at the Sobrato site in 1986. Since that time numerous investigations have been performed, including augering soil borings and collecting soil samples; installing groundwater monitoring wells and collecting groundwater samples; pushing cone penetrometers and hydropunches; performing and analyzing pumping tests; collecting soil vapor samples; and installing groundwater extraction trenches, a groundwater treatment system, and a soil vapor extraction and treatment system. These studies focused on numerous potential sources of contamination on the property, including drains, sumps, underground storage tanks, transformer areas, and areas where hazardous material was used, stored, or disposed of during the manufacturing of agricultural and military products. Evaluation and interpretation of the analytical data along the proposed project footprint for the Sobrato property indicate that:

- Soil on the property east of the Guadalupe River and immediately south of UPPR No. 4 Bridge along the proposed bypass alignment is clear and does not exceed California hazardous waste criteria (Calhoun, pers. comm.).
- Groundwater contamination on the Sobrato property is no longer of concern.
- Soil outside the bypass alignment has the potential to contain oil and lead at levels that exceed California hazardous waste criteria (CH2M HILL, 1995).

Remediation of the UPRR, Perez properties, and the Sobrato property would occur before construction of the Guadalupe River Project. All soils excavated within sites known to contain hazardous wastes would be tested and remediated in accordance with applicable regulations.

A Phase 1 Environmental Assessment of Reach A indicated that there is potential groundwater contamination from petroleum hydrocarbons. The exact location and extent of contamination is unknown, though there appear to be several responsible parties located at the San Jose International Airport.



New Figure

Figure 4.13-1. Hazardous Material Sites Needing Further Remediation

4.14 Cultural Resources

4.14.1 Archeology and History

The study area for the evaluation of cultural resources is Segments 1, 2, and 3; the Reach A mitigation site; and the Guadalupe Creek mitigation site. Archeological evidence indicates that the Santa Clara Valley was inhabited as early as 5,000 to 7,000 years ago. Anthropologists have identified the indigenous peoples at the time of contact with the Spanish as Costanoans, or "coastal peoples." This term does not imply political affinity, but refers to those peoples who exhibited similar cultural traits and who were linguistically related. Currently, the preferred term is Ohlone. Remains of villages and campsites in the area indicate that the Ohlone were hunters and gatherers who were thoroughly familiar with the environmental resources available to them. The Spanish mission period of the later 1770s and other EuroAmerican incursions resulted in severe disruption of native cultures; by the early 1800s, there was little evidence of these cultures. At present, people of Ohlone descent are active in recapturing their heritage and in setting directions as Native Americans of the future.

A number of Spanish explorers visited the Santa Clara Valley in the late 18th century. First to arrive were Gaspar de Portola and Father Juan Crespi in 1769, followed by Pedro Fages in 1770 and 1772, Riveria and Palou in 1774, and Hezeta and Palou in 1776. Both Mission Santa Clara, the eighth of 21 missions in Alta California, and the Pueblo San Jose de Guadalupe were established in 1777. The mission was moved twice because of flooding on the Guadalupe River; its third site is now occupied by Santa Clara University. Following the Mexican revolt against Spain in 1822 and the subsequent secularization of the missions in 1834, parcels of land were granted to individual landowners by the Mexican Government, and cattle ranching became an important factor in local economic and land-use patterns.

Following the gold rush of the mid-1800s, population and land use in the Santa Clara Valley continued to evolve dramatically. The gold rush brought an ever-increasing EuroAmerican population to the area, and the Asian-American population also grew significantly. The demand for mercury– essential to the gold refining process– made the quicksilver mine at New Almaden one of the largest in the world. At the same time, agriculture began to replace ranching as the area's economic mainstay. With the drought of 1863-64, even more cattle ranches were converted to wheat and dairy farms and to orchards. With the advent of the refrigerated railroad car in the 1880s, the Santa Clara Valley became a nationwide agricultural supplier. During the late 1800s, the population of San Jose exceeded that of all other settlements in California except for San Francisco.

Another important transformation in the area's economy was associated with World War II. During the war, the local economy began to shift from agriculture to industrial production. By the 1950s, the Santa Clara Valley was established as a center of the emerging high-tech industry, and land-use patterns became increasingly urbanized. This trend has continued through the present. Santa Clara Valley is now one of the world's premier centers for the high-tech and computer industries. Industrial uses and an expanding population are rapidly replacing the area's remaining rural environment.

4.14.2 Previous Cultural Resources Investigations and Known Cultural Resources

The study area has been extensively evaluated over a number of years, and its cultural resources were documented in the September 1990 EA, the 1985 Guadalupe River Interim Feasibility Report and Environmental Impact Statement, and the 1989 EIR for the Guadalupe River Park (City of San Jose, 1989), and the Upgrade of the Guadalupe Parkway, San Jose Historic Properties Treatment Plan (California Department of Transportation, 1999). As discussed in these reports and studies, the area that would be directly affected by construction activities related to the Bypass System Alternative contains no recorded prehistoric sites. Unidentified prehistoric sites may be located in the study area, but any that may be present are probably deeply buried under alluvium deposited by repeated flooding. However, historic resources have been identified in and around the study area, most recently the Wollen Mills Chinatown adjacent to the Guadalupe River at Taylor Street. These resources include structures and foundations from various phases of industrial and residential development. Although a large number of identified historic resources in the project area were demolished or moved as part of other projects or were determined to be ineligible for NRHP listing, some historic resources in the area were identified as having potential historic significance.

In 1991, Basin Research Associates conducted an intensive cultural resources inventory, including a records check, a literature search, and a pedestrian field survey for the Corps (Basin Research Associates, 1991). One prehistoric archeological site was found within the area of potential effect; no other prehistoric or historic archeological resources were discovered. The inventory addressed the entire alignment of the proposed bypass system except for part of the UPRR parcel and the Sobrato property, which are both located east of the Guadalupe River between Old Julian Street Bridge and Coleman Avenue. In 1999, the Corps conducted surveys of the UPRR parcel and the Sobrato property. No prehistoric or historic resources were found on these sites.

In 1995, two isolated burials of Native American descent were discovered during excavation for landscape mitigation in Segment 2. These were found between 5 and 9 feet below the present ground surface near what may have been an old course of the Guadalupe River. Because the remains were not located on federally owned or controlled lands, the burials were removed in accordance with procedures outlined in the California State Public Health and Safety Codes.

4.15 Resources Evaluated and Eliminated from Further Consideration

The following resources were evaluated and eliminated from further consideration: agricultural resources, geology and soils, mineral resources, and population and housing. The sections below discuss the reasons for not considering these resources in detail.

4.15.1 Agricultural Resources

No land affected by the Bypass System Alternative or the Refined Bypass System Alternative is currently under agricultural use, nor is any zoned for agricultural use. Because implementation of the Bypass System Alternative or the Refined Bypass System

Alternative would not result in the conversion of farmland to nonagricultural use, agricultural resources were eliminated from detailed consideration.

4.15.2 Geology and Soils

The Bypass System Alternative or the Refined Bypass System Alternative would not expose the public to seismic hazards or landslides; construction and operation of the Bypass System Alternative or the Refined Bypass System Alternative would not result in the substantial loss of topsoil. Thus, an evaluation of geology and soils was not conducted. The effects of erosion and sedimentation on water quality and river geomorphology are addressed in Chapter 5.

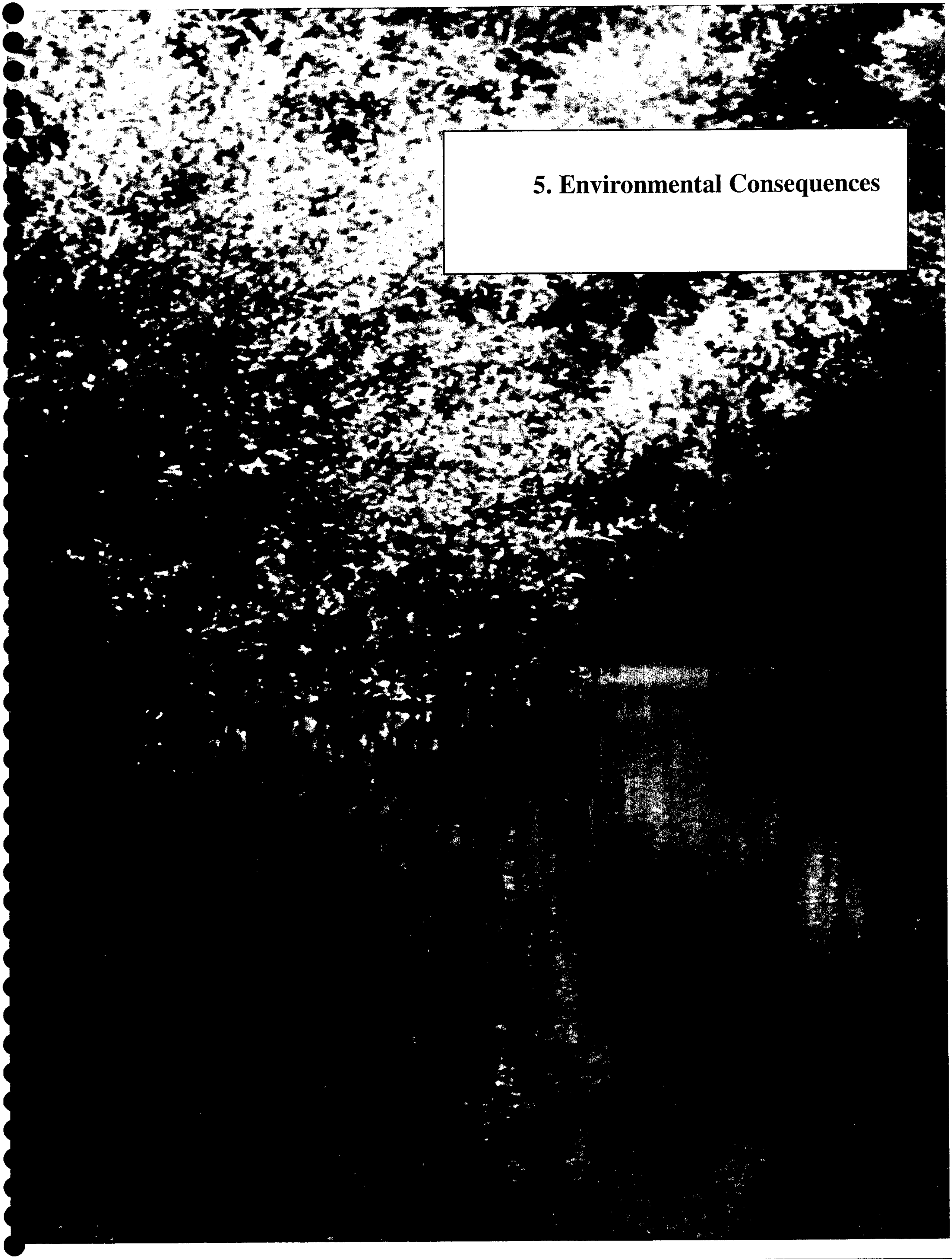
4.15.3 Mineral Resources

The site of the Bypass System Alternative or the Refined Bypass System Alternative is not in an area designated by the State Mining and Geology Board as containing mineral deposits of regional significance, pursuant to the Surface Mining and Reclamation Act of 1975. Mineral resources were thus eliminated from detailed consideration. The State's finding that the area does not contain mineral deposits of regional significance is consistent with the San Jose General Plan (City of San Jose, 1994).

4.15.4 Population and Housing

Residential housing has been removed from the area that would be affected by the Bypass System Alternative or the Refined Bypass System Alternative, and current land use designations do not permit residential use. Effects on population and housing were therefore not evaluated in detail. Residential housing in the area that would be directly affected by the Bypass System Alternative or the Refined Bypass System Alternative was removed as part of the following projects: (1) the Guadalupe River Project, evaluated in the 1985 EIS; (2) an aircraft approach and noise abatement zone created for the San Jose International Airport; and (3) the Julian-Stockton Redevelopment Project.

5. Environmental Consequences



KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions in Chapter 5:

The Refined Bypass System Alternative is now identified as the Proposed Action alternative. This change was made after the Refined Bypass System Alternative was found to be environmentally superior, environmentally preferable, and less costly during the lead agencies' review of the Draft Report.

As described in Chapter 3, the Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative, except river bank armoring under the Refined Bypass System Alternative would total 200 linear feet less than under the Bypass System Alternative. Therefore, impacts of the Bypass System and Refined Bypass System Alternatives are nearly identical except that: (1) river bank armoring in the vicinity of the New Julian Street Bridge is 200 linear feet less than under the Bypass System Alternative because the recreation trail would not extend under the New Julian Street Bridge; (2) project impacts to visual resources would be slightly less with the Refined Bypass System Alternative because there would be less bank armoring; (3) project impacts on SRA would be slightly less with the Refined Bypass System Alternative; (4) project effects on riparian-wildlife habitat resources are therefore slightly less with the Refined Bypass System Alternative, but; (5) the Refined Bypass System Alternative would result in slightly more impact to recreation, and to public access.

Additional modeling analyses (e.g., HEC-6 Movable Bed Numerical Modeling Analysis), were conducted to better determine the potential impacts of each alternative on channel erosion, sedimentation, and the river's geomorphology. The information acquired from this more sophisticated model did not support the Draft Report's determination of a significant project effect to these resources. Therefore, the assessment of potential effects has been revised and now concludes that both the Bypass System Alternative and the Refined Bypass System Alternative would have a less-than-significant adverse effect on channel erosion downstream of the Coleman Street Bridge, and would have a less-than-significant adverse effect on sediment deposition between Santa Clara and Coleman.

Additional detail regarding potential beneficial effects of the project on the overall reduction of mobile mercury-laden sediments in the project area has been added to the Water Quality Section.

Additional discussions of the bypass inlet structures are presented in the Recreation, Public Access, and Visual/Aesthetic Resources Section.

Specific responses to comments on the Draft Report are presented in Appendix 4 (Volume 2) with highlights and strikeouts showing where portions of the Draft Report were modified as reflected in this Final Report.

CHAPTER 5

Environmental Consequences

5.1 Hydrologic and Hydraulic Consequences

The Corps prepared a study of the hydrology of the Guadalupe River in 1977 (U.S. Army Corps of Engineers, 1977). The 100-year design floodflow for the Guadalupe River basin was developed by the Corps using the HEC flood hydrograph model, HEC-1. The results of the hydrology study and the HEC-1 flood hydrograph model are described in Section 4.1.1.6, "Calculation of the Design Flood."

The quantity of flow in the Guadalupe River during storm events depends on rainfall, runoff, and storage factors in the watershed that would remain independent of the Guadalupe River Project. Implementation of the No-Action Alternative, the Bypass System Alternative, or the Refined Bypass Alternative would result in no change to rainfall, runoff, and storage.

The analyses of the hydraulic effects of each alternative were developed using the Hydrologic Engineering Center – River Analysis System (HEC-RAS), a river analysis model for gradually varied steady flow (Northwest Hydraulic Consultants, 1999). The performance of the river under each of the alternatives was further analyzed using the UNET model for unsteady flow to determine the effects of larger flood events (Northwest Hydraulic Consultants, 1999). UNET was used to analyze the river and bypass system as planned in 1999. Although the design of the bypass has been refined since this modeling was conducted, the modeling output accurately predicts the operation of the river and bypass system for purposes of this NEPA/CEQA analysis. The UNET modeling output was used, in part, to evaluate the hydraulic effects of the No-Action Alternative and the Bypass System Alternative described below. The UNET model was calibrated in a manner similar to the calibration of the HEC-RAS model, as described above.

The hydraulic analysis was a feasibility-level analysis used for preliminary planning purposes. After an alternative has been chosen and the design has evolved from a concept to engineering drawings, more detailed hydraulic modeling will be completed. The preliminary planning-level hydraulic model developed for the Guadalupe River Project with Bypass System Alternative includes only the area from Park Avenue downstream to Hedding Street.

5.1.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of hydrologic and hydraulic impacts. These criteria are based on the CEQA Guidelines and professional judgment. A significant impact would occur if the project would:

- Substantially alter the existing drainage pattern of the area or substantially increase the amount of runoff in a manner that would result in onsite or offsite flooding
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems
- Expose people or structures to significant loss, injury, or death resulting from flooding
- Potential impacts were evaluated by qualitative and, in some cases, quantitative estimations of the changes in hydrologic and hydraulic conditions associated with the project. These impacts were compared with the significance criteria.

5.1.2 No-Action Alternative

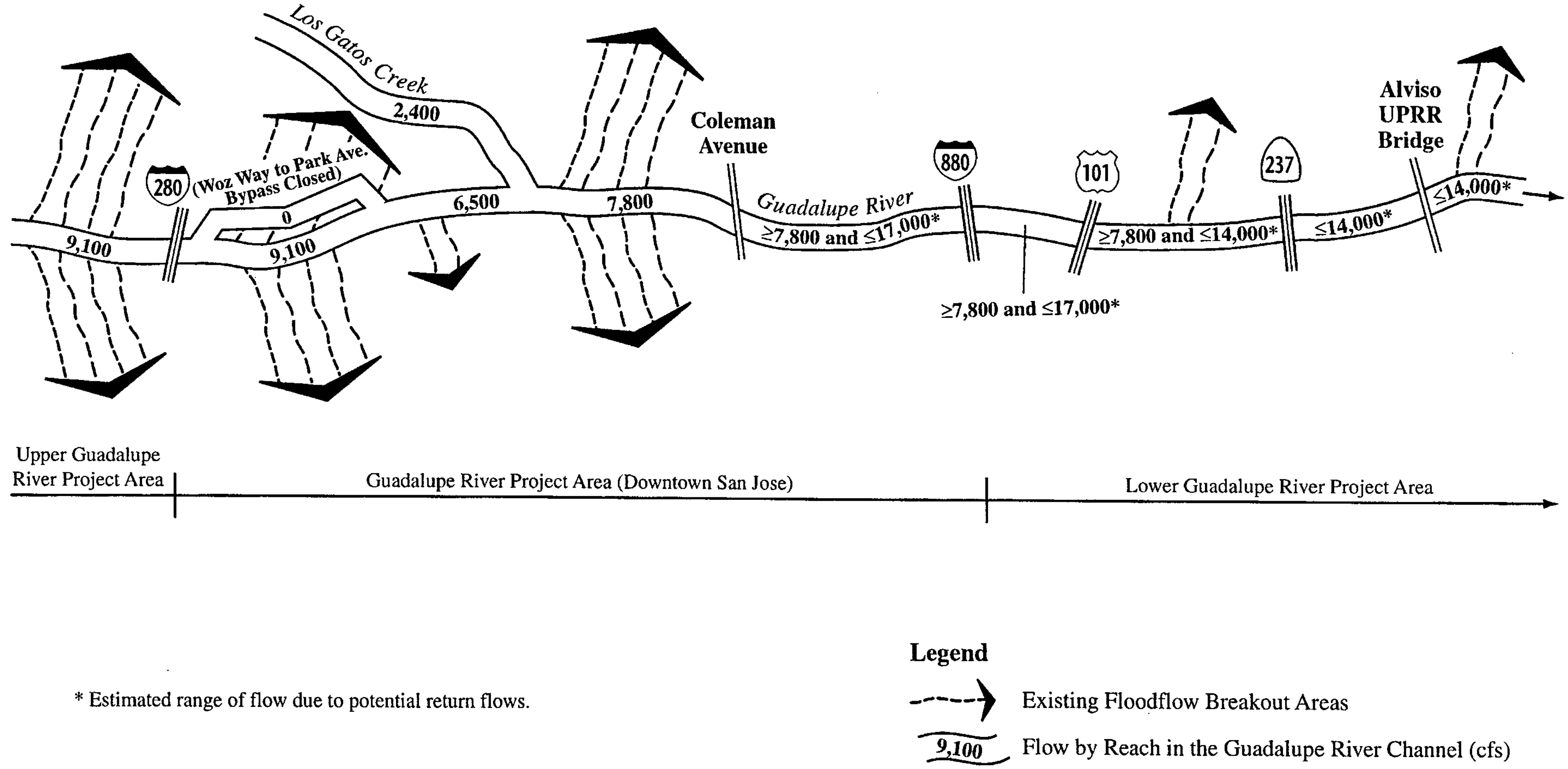
Under the No-Action Alternative, it is assumed that the bank and bed stability features would be constructed in Segment 3C Phase 2 (Section 3.3.2, "Construction Features"). It is also assumed that SCVWD would continue to use its current procedures for maintaining the channel. Figure 5.1-1 depicts the flows that would exist in the Guadalupe River at the peak of the 100-year design floodflow under the No-Action Alternative. The HEC-RAS analyses show that under the No-Action Alternative, the floodwaters would not be contained in the river channel during the 100-year design floodflow and that downtown San Jose would flood. In addition, the water-surface elevation would exceed the elevation of the underside of all the bridges that cross the river, except the Coleman Avenue Bridge (Table 5.1-1). Because the bridges were not designed to withstand the loads that would occur under pressure or overflow conditions, they could be substantially damaged or washed out during the 100-year design floodflow. The features of the No-Action Alternative would have no substantial effect on reducing the severity or frequency of flooding and would provide no flood protection benefit. Within Segment 3C Phase 2, expansion of the cross-sectional area of the river channel would slightly reduce velocities for all floodflows in Segment 3C. Because the No-Action Alternative would not increase the floodflows delivered to Segments 3A, 3B, 1, and 2, the velocities in these areas would be the same as under existing conditions.

Determination: The adverse hydrologic effects under the No-Action Alternative would be significant because potential flooding in the downtown San Jose area would not be reduced.

5.1.3 Bypass System Alternative

The Bypass System Alternative includes the construction of a bypass in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, and additional offsite mitigation. The Guadalupe River Project with Bypass System Alternative is the operation of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass.

The incremental effects of the Bypass System Alternative on hydraulic conditions were evaluated for the entire Guadalupe River Project with Bypass System Alternative. Hydraulic and hydrologic effects cannot be adequately evaluated in isolation from the effects contributed by the previously completed phases of the Authorized Project.



Source: 100-year design floodflow is based on U.S. Army Corps of Engineers (1993).

Figure 5.1-1. Flows in the Guadalupe River at the Peak of the 100-Year Design Floodflow – No-Action Alternative

No-Action Alternative include completion of Segments 1 and 2 and Segment 3C Phase 1 and Phase 2. The Woz Way to Park Avenue Bypass is closed. Floodflows break out upstream and downstream from I-280, downstream from Los Gatos Creek, downstream from Highway 101, and downstream from the Alviso UPRR Bridge.

TABLE 5.1-1. 100-Year Flood Water-Surface Elevations and the Elevation of Bridges Crossing the Guadalupe River under the No-Action Alternative, Bypass System Alternative, and Refined Bypass System Alternative
During the design floodflow for the Guadalupe River of 14,600 cfs upstream from Los Gatos Creek and 17,000 cfs downstream from Los Gatos Creek, water-surface elevations would not reach the bottoms of any bridges with the Bypass System Alternative or Refined Bypass System Alternative; water-surface elevations would reach the bottoms of all bridges except Coleman Avenue with the No-Action Alternative. Data presented are based on preliminary planning-level analysis.

Bridge	Bridge Underside Elevation (ft)	Water-Surface Elevation under the Design Floodflow Event (ft): No-Action Alternative	Bypass System Alternative	Refined Bypass System Alternative
Coleman Avenue	72.50	69.68	68.39	68.39
UPRR No. 4	75.70	78.51	71.12	71.12
Old Julian Street	77.70	80.07	71.84	71.84
New Julian Street	77.30	81.18	72.18	72.18
St. John Street	77.00	83.33	72.95	72.95
Santa Clara Street	79.80	84.72	75.21	75.21
San Fernando Street	82.20	85.75	79.31	79.31
Park Avenue	83.20	86.70	81.77	81.77

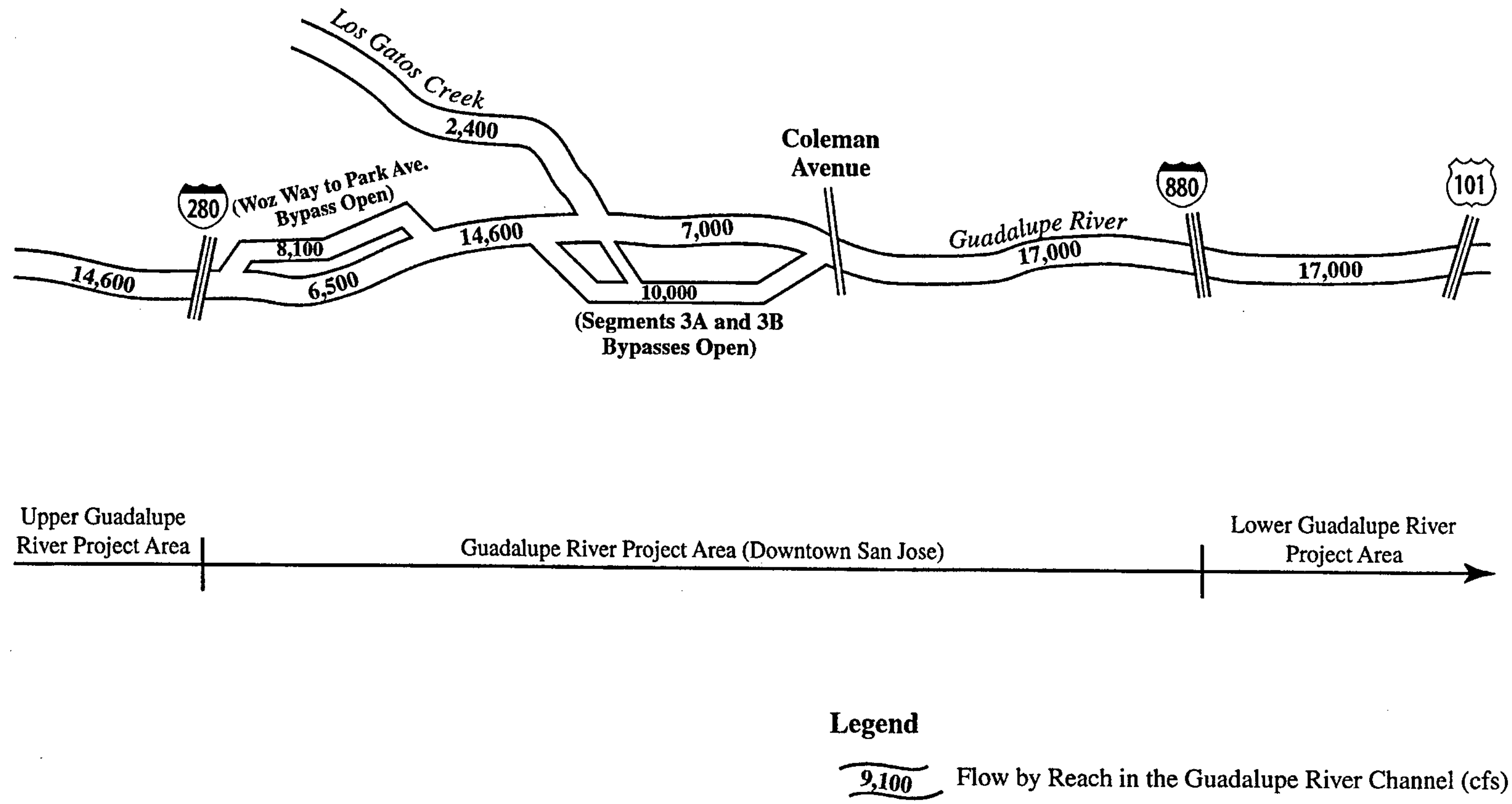
Note: Elevation is based on 1929 National Geodetic Vertical Datum.
Sources: U.S. Army Corps of Engineers, 1991b, 1993, Northwest Hydraulic Consultants, 1999.

5.1.3.1 Channel Capacity

The HEC-RAS modeling results show that if the Guadalupe River Project with Bypass System Alternative is implemented, the Guadalupe River and bypasses will be able to convey the design floodflow with several feet of freeboard, thereby preventing flooding of downtown San Jose. Figure 5.1-2 depicts the design floodflow and channel conveyance capacities that would exist with the Guadalupe River Project with Bypass System Alternative. Table 5.1-1 lists the bottom-of-bridge elevations and the calculated design floodflow water-surface elevations during the design floodflow event.

As part of the Bypass System Alternative, the flood training walls under the I-280/State Route 87 interchange in Segment 3C Phase 3 (Figure 3.5-1) would contain and train overbank flows back into the river. The flood training walls would not induce upstream flooding south of I-280. Implementation of the Guadalupe River Project with Bypass System Alternative would, in fact, result in reducing the design floodflow water-surface elevation by 1 foot at I-280 by increasing the conveyance capacity downstream from I-280.

The potential for flooding downstream from Highway 101 would increase only if the Guadalupe River Project with Bypass System Alternative were operated without the flood protection benefits provided by the Lower Guadalupe River Project. As explained in Section 3.4.4, "Operation and Maintenance," the Guadalupe River Project with Bypass System Alternative will not be made operational until the Lower Guadalupe River Project is completed. Therefore, the Guadalupe River Project with Bypass System Alternative would not induce additional downstream flooding.



Source: 100-year design floodflow is based on U.S. Army Corps of Engineers (1993).

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Figure 5.1-2. Flows in the Guadalupe River at the Peak of the 100-Year Design Floodflow for the Bypass System Alternative and Refined Bypass System Alternative

The Bypass System Alternative and Refined Bypass System Alternative include completion of Segment 3. Segments 1 and 2 are already completed. The Woz Way to Park Avenue Bypass is operational. The bypasses in Segments 3A and 3B are operational. With completion of the Bypass System Alternative or the Refined Bypass System Alternative and operation of the bypasses, floodflows remain in the Guadalupe River channel.

The Bypass System Alternative would result in water-surface elevations that do not exceed the elevations of the bottom of bridges crossing the Guadalupe River. The Guadalupe River Project with Bypass System Alternative would reduce the frequency and severity of flooding in downtown San Jose, which is considered to be a beneficial effect.

Determination: The hydrologic effects of the Guadalupe River Project with Bypass System Alternative would be a significant benefit because the 100-year design floodflow, would be conveyed, protecting downtown San Jose from flooding.

5.1.3.2 Flow Velocity

Table 5.1-2 lists representative hydraulic properties of the Guadalupe River in the project area based on preliminary planning-level analysis. When compared to the data presented for existing conditions (Table 4.1-4), the Guadalupe River Project with Bypass System Alternative would alter the velocities in all reaches between Park and Coleman Avenues. There would be no effect in the reach between the bypass outlets at Coleman Avenue and downstream to I-880.

Under the 2-year flood event, the Guadalupe River Project with Bypass System Alternative would result in reductions in velocity for all segments of the river between I-280 and Coleman Avenue. Under the 10-year flood event and the 100-year design floodflow, the velocities would increase between Park Avenue and St. John Street but decrease through the natural channel of the bypassed reach between St. John Street and Coleman Avenue.

Figure 5.1-3 compares the mean channel velocity under existing conditions and under the Guadalupe River Project with Bypass System Alternative for all cross sections included in the HEC-RAS model for the 2-year and 10-year flood events as well as the 100-year design floodflow. The data in Figure 5.1-3 are based on a preliminary planning-level analysis of the Guadalupe River Project with Bypass System Alternative, which included construction of bypass inlets above West Santa Clara Street. Figure 5.1-3 shows that the cross sections upstream from Santa Clara Street would have an increase in velocity under the 100-year design floodflow. Cross sections between St. John Street and Coleman Avenue would have a decrease in velocity relative to existing conditions. Recent additional physical and mathematical modeling by the Corps indicates that bypass system inlets should be placed downstream from West Santa Clara Street, as described in the Bypass System Alternative (Section 3.4.2.1, "Bypass System"). The recent modeling also indicates that the velocities upstream from Park Avenue would actually be lower than under existing conditions (Mifkovic, pers. comm.). The impact analysis in this report assumes that the flow velocities upstream from Park Avenue will be lower than under existing conditions, based on the latest modeling results.

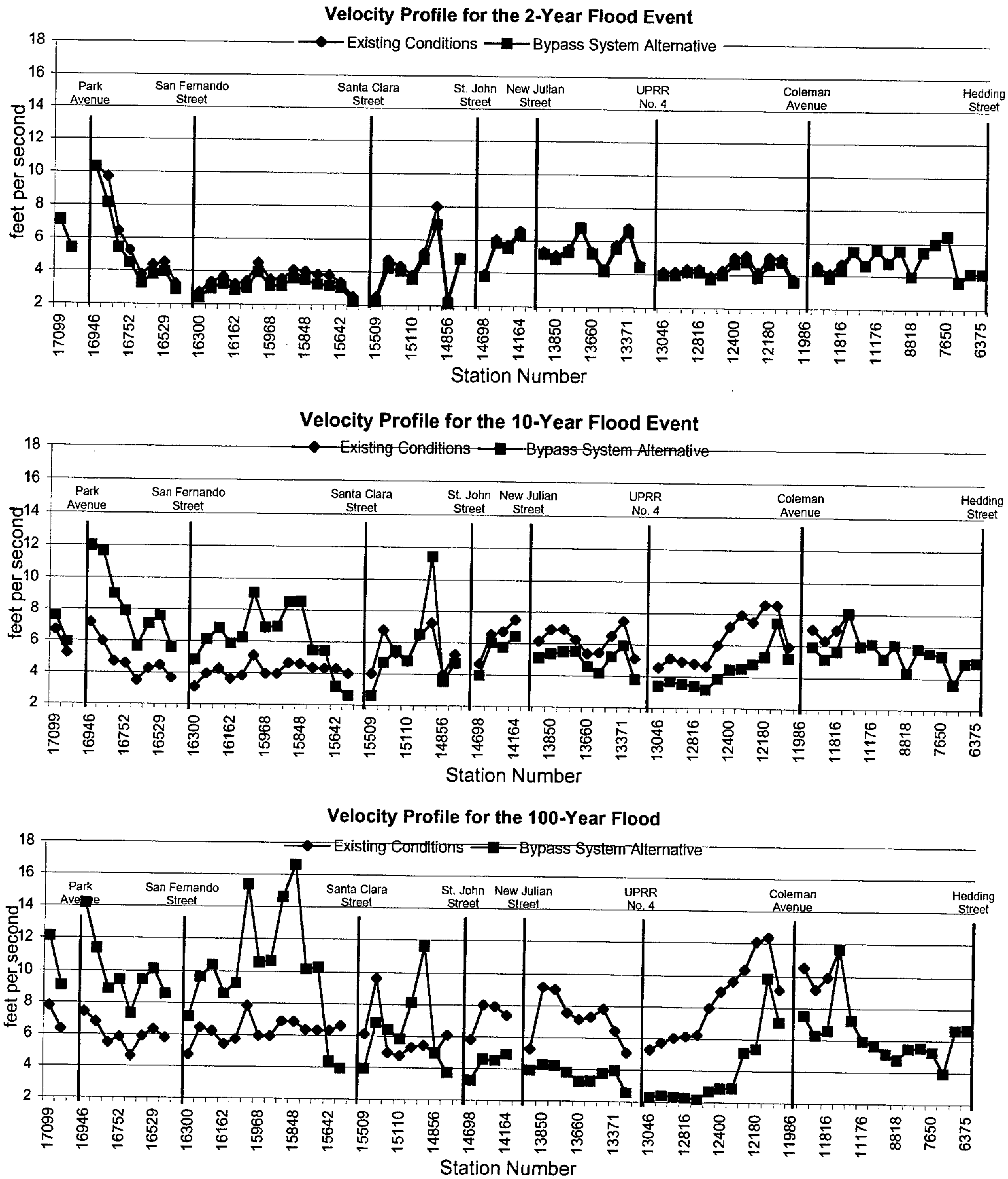
Table 5.1-3 compares the expected water velocities in the proposed bypass and in the natural channel just upstream from the bypass outlets at Coleman Avenue. Velocities during the 2-, 5-, 10-, and 20-year flood events would be lower in the natural channel than in the bypass. For flows larger than the 20-year flood event, the bypass would have greater velocity than the natural channel. Water velocities in the operational Woz Way to Park Avenue bypass would be similar to those shown in Table 5.1-3 for the proposed bypass system.

TABLE 5.1-2. Representative Hydraulic Properties of the Guadalupe River under the Bypass System Alternative, Refined Bypass System Alternative, and No-Action Alternative
Velocity and depth generally increase with discharge. Data presented are based on preliminary planning-level analysis.

	Existing Conditions			No-Action Alternative[a]		Bypass System Alternative			Refined Bypass System Alternative[b]		
Flood Event Interval (years)	Mean Channel Velocity (ft/sec)	Water Depth (ft)	Discharge (cfs)	Mean Channel Velocity (ft/sec)	Water Depth (ft)	Mean Channel Velocity (ft/sec)	Water Depth (ft)	Discharge (cfs)	Mean Channel Velocity (ft/sec)	Water Depth (ft)	Discharge (cfs)
Park Avenue to San Fernando Street											
2	5.22	3.6	1,725	–	–	4.48	4.2	1,725	4.48	4.2	1,725
10	4.56	10.5	5,025	–	–	7.86	6.7	5,025	7.86	6.7	5,025
100	5.81	19.9	14,600	–	–	9.37	13.7	14,600	9.37	13.7	14,600
San Fernando Street to Santa Clara Street											
2	3.52	5.8	1,725	–	–	3.1	6.5	1,725	3.1	6.5	1,725
10	3.95	12.8	5,025	–	–	6.9	8.1	5,025	6.9	8.1	5,025
100	5.92	21.6	14,600	–	–	10.57	13.7	14,600	10.57	13.7	14,600
Santa Clara Street to New Julian Street											
2	4.36	9.7	2,300	5.2	5.8	4.06	9.5	2,075	4.06	9.5[a]	2,075[a]
10	5.31	15.8	6,700	6.9	13.8	5.45	11.8	4,000	5.45	11.8[a]	4,000[a]
100	4.93	24.2	17,000	8.7	22.4	6.41	14.6	7,000	6.41	14.6[a]	7,000[a]
New Julian Street to Coleman Avenue											
2	4.18	10.9	2,300	5.1	6.2	3.96	10.6	2,075	3.96	10.6[a]	2,075[a]
10	5.11	17.7	6,700	7.2	13.6	3.68	14.7	3,400	3.68	14.7[a]	3,400[a]
100	5.72	25.9	17,000	8.6	24.0	2.41	19.9	4,000	2.41	19.9[a]	4,000[a]
Coleman Avenue to I-880											
2	5.55	8.8	2,300	–	–	5.55	8.8	2,300	5.55	8.8	2,300
10	6.08	12.6	6,700	–	–	6.08	12.6	6,700	6.08	12.6	6,700
100	5.12	18.3	17,000	–	–	5.12	18.3	17,000	5.12	18.3	17,000

[a] = HEC-RAS model does not provide information for these reaches. Discharge under the No-Action Alternative would be the same as indicated for existing conditions.
[b] = Channel velocity, water depth, and discharge for the Refined Bypass System Alternative could be slightly less or slightly more than for the Guadalupe River Project with Bypass System Alternative.

Source: Elliott, pers. comm.



Revised Source: Elliot Pers. Com.

Figure 5.1-3. Velocity Profiles at Cross Sections in the HEC-RAS Model for Existing Conditions and the Bypass System Alternative.

Velocity Profiles are Presented for the 2-Year, 10-Year, and 100-Year Flood Events. Data Presented is based on preliminary planning level analysis.

TABLE 5.1-3. Estimate of Flow Velocities in the Bypass and in the Natural Channel Just Upstream from the Bypass Outlets under Six Floodflow Conditions
Under the 20-year or greater flood, the velocity at the bypass outlets will exceed the velocity in the natural channel.

Flood Event Interval (years)	Total Discharge (cfs) in the River	Mean Velocity (ft/sec)	
		Natural Channel	Bypass
2	2,300	4.3	0.3
5	4,500	5.6	3.4
10	6,700	6.8	6.0
20	9,300	7.9	8.3
50	13,500	9.3	11.3
100	17,000	10.4	13.5

Source: Mifkovic, pers. comm.

Determination: The Guadalupe River Project with Bypass System Alternative would not significantly affect flow velocities. Although increases in velocities are not significant adverse effects, changes in velocity may affect river geomorphology and biological resources; these potential changes are described in Sections 5.2, "River Geomorphology," and 5.6, "Biological Resources – Fish."

5.1.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative, except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The estimated bridge clearance, representative depths, and velocity profiles are shown in Table 5.1-1, Table 5.1-2, and Figure 5.1-3, respectively.

Determination: The hydraulic effects of the Refined Bypass System Alternative would be the same as those described under the Bypass System Alternative. As described above, changes in channel flow velocities are not considered adverse impacts.

5.2 River Geomorphology

The analysis of effects on river geomorphology evaluates channel erosion and deposition and river morphology.

5.2.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of effects on river geomorphology. These criteria are based on the CEQA Guidelines and professional judgment. Construction and operation activities would result in a significant effect if they would:

- Substantially increase erosion or loss of topsoil

- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project
- Substantially alter riverbed and bank stability
- Substantially alter riffle/run/pool ratios
- Substantially increase sediment deposition

Both qualitative and quantitative estimations were used to assess the potential effects on river geomorphology.

5.2.2 No-Action Alternative

Under the No-Action Alternative, the bed and bank improvements in Segment 3C Phase 2 would be made, but no flood bypass or invert stabilization structures would be constructed in Segments 3A and 3B. SCVWD would continue its current channel maintenance procedures in the downtown reach. SCVWD currently conducts limited maintenance activities on the reaches of the Guadalupe River between I-880 and I-280. These procedures include large woody debris removal, if the debris could block or otherwise impede floodflows; sediment removal; and bank stabilization. Under the No-Action Alternative, SCVWD would continue to conduct current debris and sediment removal and bank stabilization activities to preserve the as-built design and conveyance capacity of the Guadalupe River. Debris and sediment removal, if required, would continue to be performed from the top of bank or from existing access points to avoid impacts on bank vegetation. Bank stabilization measures would continue to be implemented only when necessary to protect adjacent properties and public facilities. See Section 3.4.4, "Operation and Maintenance."

5.2.2.1 Channel Erosion and Deposition

Sediment transport capacity under the No-Action Alternative would be similar to that under existing conditions. Overall, the river would continue to be sediment-starved or to erode through Segments 1, 2, and 3. Active channel bed and bank erosion would continue to occur in some areas as a result of sediment-starved flows.

Localized transport and deposition of bedload sediment such as cobbles, gravels, and sands would continue to occur depending on the magnitude and duration of a particular flow event. Bedload sediment is transported only when sufficient energy is present. Channel widening in Segment 3C Phase 2 would likely alter the precise location of sediment deposition within the Segment 3C portion of the river; however, the overall potential for sediment deposition would be similar to the potential under existing conditions.

Determination: Localized erosion and deposition of bedload sediment is considered a less-than-significant adverse effect because the overall sediment load and transport properties of the river would remain unchanged.

Under the No-Action Alternative, the riverbed and bank armoring installed in Segment 3C Phase 2 would protect this river segment from erosion. Because the Segment 3C Phase 2 features would not change sediment transport capacity or sediment load carried in

riverflows downstream from this reach, the existing river channel erosion and deposition processes would continue in other areas of the downtown reach and areas downstream.

Determination: There would be no adverse effect because the No-Action Alternative would not change the characteristics of channel erosion occurring under existing conditions.

With implementation of the No-Action Alternative, it is likely that bedload sediment would continue to accumulate in certain areas, such as the constructed low-flow channels in Segments 1 and 2 that require ongoing maintenance. Preliminary sediment transport analyses of the Segment 3C Phase 2 design indicate that with a 25-year or greater floodflow, sediment would likely accumulate in the Segment 3C Phase 2 low-flow channel. For less than 25-year floodflows, Segment 3C would be sediment-starved and sedimentation would be limited. However, localized deposition of sediment could continue to occur in Segment 3C after the more frequent floodflows where the Highway 87 and Interstate 280 bridge piers affect channel hydraulics, requiring ongoing maintenance (Northwest Hydraulics Consultants, 1999).

Determination : Maintenance activities would have no adverse effect on downstream channel erosion or river morphology because the likely volume of bedload sediment that would be removed by maintenance is insignificant compared to the overall sediment load of the river. The low-flow channel maintenance activities would be conducted in a manner consistent with the methods currently employed by SCVWD as described above in Section 5.2.2. Additionally, as described in Section 1.6.15, SCVWD is developing a programmatic EIR for their Stream Maintenance Program that will address the potential effects of ongoing channel maintenance in the entire Guadalupe River, including the project area.

5.2.2.2 River Morphology

Under the No-Action Alternative, river morphology and geomorphic processes would be similar to those under existing conditions. However, the current riffle/run/pool complex in Segment 3C would be lost when the channel bed is armored with CCM during Segment 3C Phase 2 construction. Under this alternative, a low-flow channel would be constructed in the armored channel bed to provide fish passage through Segment 3C (Figure 3.3-1). Riverbed armoring and a low-flow channel would replace the existing channel form features, predominantly pools separated by short riffles, with an armored surface containing a more uniform series of artificial step pools and steep runs.

Determination: The changes in channel form in Segment 3C Phase 2 would result in less-than-significant adverse effects because the pattern of pools, riffles, and runs would not change substantially throughout the rest of the river. These channel form changes, however, have the potential to affect habitat values for aquatic species. The affects of channel form changes on biological resources are described in Section 5.6, "Biological Resources – Fish."

5.2.3 Bypass System Alternative

The Bypass System Alternative includes the construction of a bypass in Segments 3A and 3B, the construction of flood training walls that direct overbank flows back to the river in Segment 3C, expanded onsite mitigation, and additional offsite mitigation. The Guadalupe River Project with Bypass System Alternative includes the operation of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass reach. The incremental effects of the Bypass

System Alternative on channel erosion, deposition, and river geomorphology cannot be adequately evaluated in isolation from the effects contributed by the previously completed phases of the Authorized Project. For this reason, the effects of the Bypass System were evaluated for the Guadalupe River Project with Bypass System Alternative, rather than for only the construction and operation of Segments 3A and 3B.

As discussed in Section 5.1.3.2, "Flow Velocity," the Guadalupe River Project with Bypass System Alternative would not change the flows or velocities downstream from Coleman Avenue in Segments 1 or 2 or Reach A under any floodflow. The primary change in hydraulic conditions as a result of bypass operation would consist of changes in flows and corresponding velocities in Segments 3A and 3B. These changes in flows and velocities have the potential to influence the downstream channel erosion and deposition processes and river morphology in Segments 1, 2, and 3 downstream in Reach A, and beyond to Trimble Road.

5.2.3.1 Channel Erosion and Deposition

This section describes potential changes in the patterns of channel bed erosion and deposition expected under the Bypass System Alternative. Changes in either channel erosion or deposition are reflected in the amount of sediment transported from one segment of a river to the next. As discussed in Section 4.2.1, sediment transport occurs in two principal forms, washload sediment and bedload sediment. Washload sediment is eroded material in the form of clays, silts, and fine sands that becomes suspended in the water column, does not settle out, and is normally transported to the mouth of the river. Bedload sediment is larger eroded material that is transported only when sufficient energy is present. Consequently, bedload sediment may be eroded from one channel bed location, transported a potential distance of feet or miles, and deposited at another location downstream, depending on the magnitude and duration of a particular flow event.

The relative difference between erosion and deposition in any given river segment is referred to as the "sediment balance." The sediment balance reflects the net change in erosion and deposition, as measured by the numerical models described in the following sections. For example, a sediment imbalance would be indicated when, in a particular reach, the localized erosion exceeds the general depositional nature of the reach or vice versa. This sediment balance information is used to identify areas of a river that require a more detailed study of hydraulic conditions. The following discussions describe the sediment transport analyses that have been and are being conducted for the Guadalupe River Project with Bypass System Alternative. The first is a quantitative evaluation of bedload sediment transport and the potential for channel erosion and deposition, followed by a qualitative discussion of washload transport.

Bedload Sediment Transport. Two numerical sediment transport analysis methods have been used to evaluate potential channel erosion and deposition characteristics of the Guadalupe River Project with Bypass System Alternative. These methods are knows as the Sediment Accounting Methodology model (SAM) and the Hydraulic Engineering Center-6 (HEC-6) movable bed numerical model.

The first method used was SAM. SAM is a preliminary, planning-level, sediment transport continuity model developed by the Waterways Experiment Station (WES). The SAM model

estimates the potential for erosion and deposition of bedload sediment based on a simplified representation of channel hydraulics for each river reach. The SAM model does not consider natural or artificial bed armoring and assumes that material can be eroded to meet the potential energy levels described by the representative hydraulic conditions. Consequently, the results of the SAM model may overestimate the amount of potential channel erosion or deposition in rivers that have bedrock or other resistant materials that would limit channel erosion. In addition, the SAM model cannot identify precise locations of potential sediment deposition or erosion. However, the results of the SAM model can be used as a preliminary screening tool to indicate a potential for substantial channel erosion or deposition that warrants further investigation.

The second method uses the HEC-6 "Scour and Deposition in Rivers and Reservoirs" movable bed numerical model, that was developed by the Hydraulic Engineering Center (HEC). HEC-6 is sophisticated movable bed sediment transport model. The HEC-6 sediment model estimates erosion and deposition based on the hydraulic characteristics at numerous cross sections within each river reach. The HEC-6 sediment model also considers the depth and texture of the channel bed and bank materials as well as underlying resistant layers that would limit erosion when calculating channel bed scour.

Sediment Accounting Methodology Analysis. The SAM model was initially used to evaluate the potential for excessive channel erosion and deposition under the preproject (1985) site conditions, and under the Authorized Project (U.S. Army Corps of Engineers, 1991b). The sediment transport relationships developed for the 1985 conditions, which are described in the GDM, were subsequently used in a second SAM model study to evaluate the sediment transport properties under the Bypass System Alternative and under the existing 1999 site conditions (Northwest Hydraulic Consultants, 1999).

Under the existing (1999) conditions (Section 3.2, "Completed Portions of the Authorized Project"), the SAM model study indicated that the average annual sediment transport in Segments 3A and 3B after the 2-, 10-, 25-, 50-, and 100-year design floods would be slightly sediment starved, or eroding. Under the Guadalupe River Project with Bypass System Alternative, the SAM model study indicated that during the 2-, 10-, 25-, 50-, and 100-year design floods Segments 3A and 3B would be slightly depositional (Northwest Hydraulic Consultants, 1999). Despite showing a slight depositional trend, the SAM model study concluded that the operation of the Guadalupe River Project with Bypass System Alternative would result in little or no change in average annual sediment transport in Segments 3A and 3B. Although the SAM model study indicated that the bypassed river reach in Segments 3A and 3B would be slightly depositional, it was still expected that velocities at several small locations in Segments 3A and 3B would remain high enough, even with operation of the bypass system, to cause some localized channel bed erosion (Northwest Hydraulic Consultants, 1999). Therefore, the Bypass System Alternative includes construction of several invert stabilization structures in Segments 3A and 3B.)

The SAM model was also used to investigate sediment transport in Segments 1 and 2 (Northwest Hydraulic Consultants, 1999). On an average annual basis, the potential for bed erosion under the Guadalupe River Project with Bypass System Alternative was estimated to be 23, 400 tons per year. This erosion rate was approximately twice the rate expected in Segments 1 and 2 under preproject (1985) conditions (Section 4.2.2, "Channel Erosion and Deposition"), and approximately five times greater than the erosion rate of 4,300 tons per

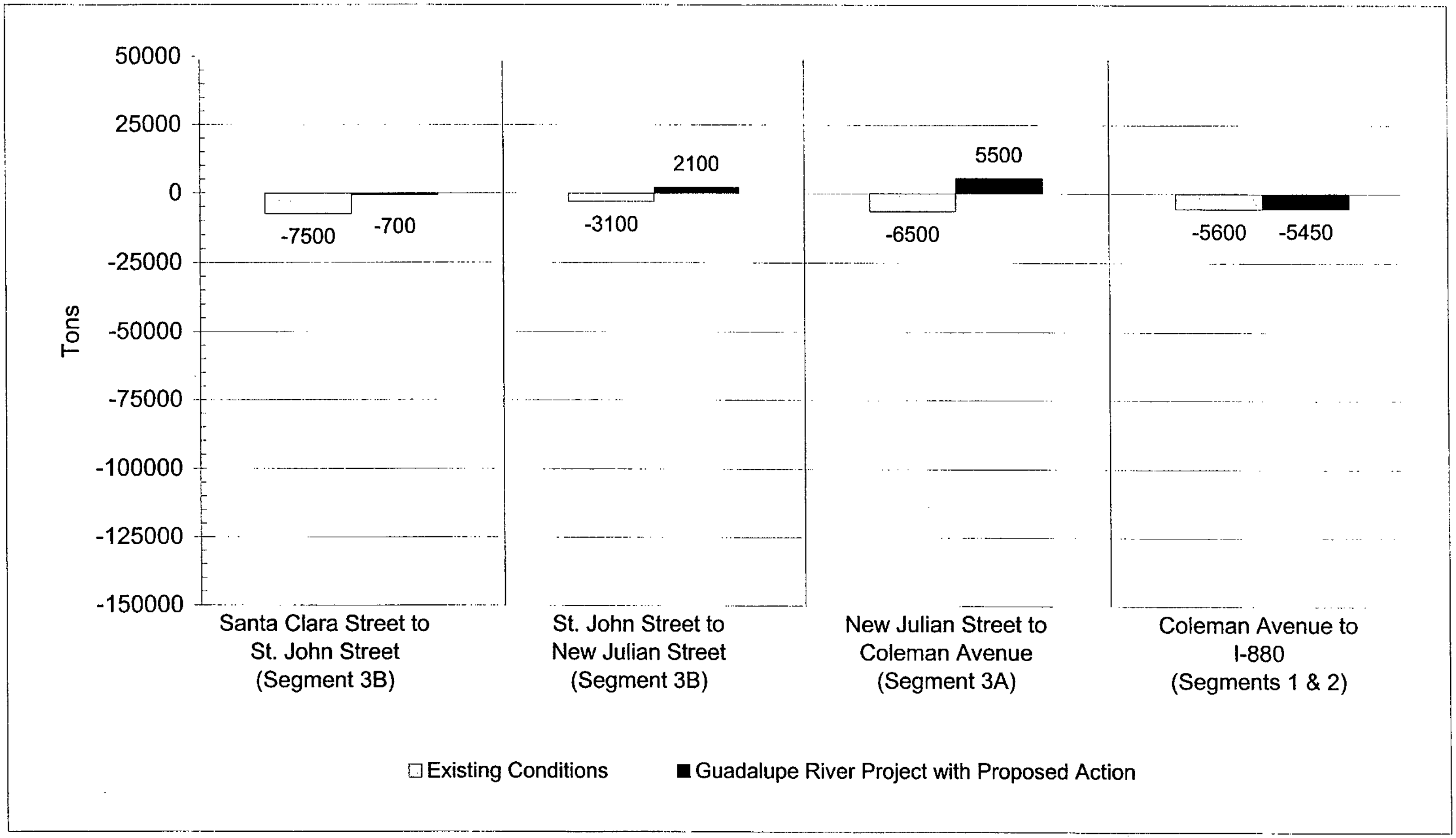
year expected under the existing (1999) conditions). The SAM model study also estimated the amount of erosion expected during a 100-year design flood flow. With the Bypass System Alternative in place, the potential for erosion in Segments 1 and 2 during the design flood was estimated to be 121,700 tons, or approximately 100 times greater than the 1,300 tons of erosion expected if the 100-year design flood were to occur under the existing (1999) conditions.

Using this information, the Draft EIR/SEIS determined that the potential for erosion in Segments 1 and 2 was a significant adverse effect of the Bypass System Alternative. Although the SAM model was acknowledged to be a preliminary, planning-level tool, the SAM studies were the best information available when the Draft EIR/SEIS was written. As discussed previously, the SAM model uses simplified representations of channel hydraulics and does not consider the actual composition of the riverbed when calculating the potential for erosion or deposition. As described in Section 4.2.2, stiff clay and silt deposits that are resistant to erosion underlie most of the project area. The existing natural channel bed also contains embedded cobbles, gravels, and other erosion-resistant materials that provide additional bed armoring not considered in the SAM analysis. The Draft EIR-SEIS recommended that a more detailed movable bed sediment transport analysis be completed to better evaluate the potential for erosion and deposition. The Draft EIR/SEIS also suggested placing invert stabilization structures in Segments 1 and 2 , if necessary, to prevent bed erosion.

Movable Bed Numerical Modeling Analysis. The Sacramento District of the Corps has recently completed an initial HEC-6 movable bed sediment transport study to estimate potential channel erosion and deposition under existing (1999) conditions and under the Bypass System Alternative during a 100-year design flood (U.S. Army Corps of Engineers, 2000). The information acquired from this more sophisticated model was not available at the time the Draft EIR-SEIS was written. This HEC-6 study analyzed the effects of the operational Guadalupe River Project with Bypass System Alternative on the area between I-280 and Airport Parkway, including all of Segments 1 and 2 (U.S. Army Corps of Engineers, 2000).

Figure 5.2-1 shows the results of the initial HEC-6 study for the project area between West Santa Clara Street and Coleman Avenue. If the 100-year design flood were to occur under the existing (1999) conditions, all reaches between West Santa Clara Street and Coleman Avenue would be slightly erosional, each losing between 3,100 and 7,500 tons of sediment. Under the Guadalupe River Project with Bypass System Alternative, the potential for erosion would be lower in each reach. In fact, the two reaches between St John Street and New Julian Street would become slightly depositional as high flows are diverted into the bypass culverts above St John Street. Although Segment 3B and Segment 3A would become depositional, there will be localized areas of erosion in each segment (U.S. Army Corps of Engineers, 2000).

The initial HEC-6 study also indicates that Segments 1 and 2 would be slightly erosional during a 100-year design flood under both the existing conditions and the Bypass System Alternative. Under the Bypass System Alternative, about 5,450 tons of bedload sediment material would be eroded from Segments 1 and 2 during a 100-year design flood, which is essentially the same amount of material that would be eroded under existing conditions (Figure 5.2-1) (U.S. Army Corps of Engineers, 2000). There is no significant difference



New Source: U.S. Army Corps of Engineers, 2000

Figure 5.2-1. Sediment Balance During the 100-Year Design Flood Event Using Movable Bed Analyses (HEC-6)

Tons of bedload sediment erosion or deposition expected from four reaches of the Guadalupe River during the 100-year design flood. Preliminary results from HEC-6 simulation, which are subject to revision with ongoing sediment studies.

TABLE 5.2-1. Estimated tons of channel bed erosion using the HEC-6 model for a range of floods in Segments 1 and 2 of the Guadalupe River Project with Bypass System Alternative.

Recurrence Interval	Estimated Channel Bed Erosion (tons)
100-year	-5,450
20-year	-4,800
10-year	-3,950
5-year	-3,750
2-year	-3,000

Source: U.S. Army Corps of Engineers, 2000

between erosion that would occur under the existing conditions and under the Bypass System Alternative.

Although Segments 1 and 2 would be erosional over all, the HEC-6 study indicates that there would be a short depositional area somewhere between Coleman Avenue and Taylor Street. A depositional area is expected in this reach because rising floodflows in Segments 1 and 2 would expand onto the adjacent floodplain terrace, decreasing water velocities in the channel, and allowing sediments to deposit in the channel during large flood events. Results from the initial HEC-6 study also show that Segments 1 and 2 would also be slightly erosional during smaller flood events. Table 5.2-1 shows the anticipated quantity of erosion that would occur in Segments 1 and 2 under a 2-, 5- 10-, 20-, and 100-year design floods.

An HEC-6 study evaluating the effect of smaller flood events on reaches between West Santa Clara Street and Coleman Avenue is not yet available. However, it is anticipated that the proportional decrease in erosion seen in Segments 1 and 2 as the flows decrease would also be seen in the other reaches. U.S. Army Corps of Engineers, 2000).

The Bypass System Alternative includes construction of 9 to 20 invert stabilization structures in Segments 1 and 2 (Section 3.4.2.4, "Invert Stabilization Structure"). These invert stabilization structures would help retain spawning gravels and prevent localized bed erosion. The invert stabilization structures would also help form and maintain an open low flow channel by providing sediment transport during low flows (Figure 3.4-8) and preventing excess sediment deposition that could fill pools and create riffles. In addition, invert stabilization structures minimize deposition of sediments that could direct low flows against the riverbank, thereby preventing localized bank erosion and bank instabilities.

Determination: Although the Draft EIR-SEIS indicates that the Bypass System Alternative would substantially increase erosion potential in Segments 1 and 2, this determination was made based on a simple and preliminary analysis method. A more in-depth, sophisticated, and robust HEC-6 study was conducted. The results of this new study do not support the previous determination, and have shown that the operation of the Guadalupe River Project

with Bypass System Alternative would have a less-than-significant effect on channel erosion and deposition in Segments 1, 2, 3A, and 3B.

HEC-6 studies will continue as the Bypass System Alternative progresses through the final design process. As detailed geophysical data such as depth and texture of bed materials are collected to facilitate the final design, these data will also be used to refine the HEC-6 model. In addition, a physical model of the Guadalupe River has been constructed to analyze and refine the hydraulic characteristics and sediment transport characteristics of the bypass system. Results from the physical model and additional HEC-6 studies will be used to refine the final project design, and to identify precise locations of potential sediment deposition or erosion. If locations of erosion are identified, invert stabilization structures would be installed in those locations to eliminate the potential for erosion. The Bypass System Alternative includes the construction of invert stabilization structures, if needed, in Segments 3A and 3B and in Segments 1 and 2. As part of the final design of the Guadalupe River Project with Bypass System Alternative, the HEC-6 model would be used to determine the need for, number, and placement of invert stabilization structures.

Determination: Invert stabilization structures would mitigate any project erosion effects to a less-than-significant level. Therefore, the implementation of the Bypass System Alternative would not result in a significant adverse effect on channel erosion or deposition.

In addition, the Corps and SCVWD will annually monitor channel bed stability and bank stability in accordance with the MMP (Section 4.3.4.9 in Appendix 3). This monitoring will assure that unexpected erosion or deposition does not occur after the Bypass System Alternative is operational. If monitoring reveals that it is necessary, remedial actions would be developed in accordance with the MMP, and a required environmental analysis under NEPA and CEQA would be completed.

Washload Sediment Transport. Operation of the Guadalupe River Project with Bypass System Alternative is not expected to change patterns of washload transport because no project-related changes would be made to the channel maintenance flows that would result in the transportation of clays, silts, or fine sands. As described in Section 4.2.3, "River Morphology," the channel maintenance flow is approximately 1,200 cfs. The bypass system would not begin to operate until flows exceeded a minimum of 1,500 cfs. So channel maintenance flows in the river would be maintained with the project.

Determination: Operation of the Guadalupe River Project with Bypass System Alternative would have no adverse effect on washload transport because there would be no project-related changes to the channel maintenance flows.

5.2.3.2 River Morphology

The construction of the Guadalupe River Project with Bypass System Alternative would result in direct modifications of the existing channel form. Portions of Segment 3B and all of Segment 3C would be armored to prevent channel erosion (Figure 3.4-1), and artificial low-flow channels would be placed in the armored channel bed (Section 3.4.2, "Construction Features"). Armoring the channel bed would eliminate natural pools and runs in Segment 3B. However, armoring would not affect the river's morphology because the constructed low-flow channels will be designed to replace pools, runs, and riffles in the armored sections. The design of the constructed low-flow channel would result in a channel form

through the armored channel bed areas that would likely consist of longer riffles and runs separated by small pools, rather than the existing large pools separated by short riffles (Section 4.2, "River Geomorphology"). The remaining natural channel bed in Segments 1, 2, 3A, and 3B would be modified by the installation of invert stabilization structures (Section 3.4.2.4, "Invert Stabilization Structures"). Results from the physical model and the additional refined HEC-6 studies will be used to determine the exact number and location of invert stabilization structures (Section 5.2.3.1). As discussed in Section 5.2.3.1, these invert stabilization structures would likely retain gravel, resulting in an increase the number of riffles in Segments 1, 2, 3A, and 3B compared to existing conditions. Although constructing these features would have local effects on channel form, the features will all be designed to convey the channel maintenance flow and sediment in a manner similar to the existing conditions. Therefore, these features would not alter the geomorphic processes in the remainder of the river.

Determination: Channel bed armoring in Segments 3B and 3C and installation of invert stabilization structures in Segments 1, 2, 3A, and 3B in the Guadalupe River Project with Bypass System Alternative would have no adverse effect on ongoing river geomorphology. Because the underlying geomorphic processes would not be altered by the Bypass System Alternative, the river's geomorphology is not expected to change.

Operation of the Guadalupe River Project with Bypass System Alternative and diversion of the floodflows into the existing Woz Way to Park Avenue bypass and proposed bypass systems would reduce maximum flow in most of the downtown reach of the river channel. However, operation of the two bypass systems, Woz Way and Proposed Action, is expected to have minimal effects on the magnitude and duration of flows responsible for channel maintenance. The flow required to initiate diversion into the bypass systems would be at least 1,500 cfs. The diversion of a portion of floodflows in excess of 1,500 cfs to the bypass system would not affect the frequency or duration of channel maintenance flows in the natural river channel. Consequently, there would be no change in long-term channel maintenance processes. Floodflow diversion into the bypass would not increase the amount of washload deposited in the natural channel of the river.

Determination: The operation of the Guadalupe River Project with Bypass System Alternative and diversion of flows to the bypass systems would have no adverse effect on ongoing river geomorphology, including riffle/run/pool formation in the river channel transport because there would be no project-related changes to the channel maintenance flows.

5.2.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all of the flood protection components that would be constructed as part of the Bypass System Alternative, except for 200 feet of armoring on the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge (Section 3.5, "Comparison Summary of Project Features"). The channel erosion and deposition characteristics under the Refined Bypass System Alternative would be similar to those described under the Bypass System Alternative because the project features would be nearly identical and project operation would be identical. There could be a slight increase in the potential for erosion on the east bank adjacent to New Julian Street because of the reduction in armoring.

Determination: Operation of the Guadalupe River Project with Refined Bypass System Alternative would have a less-than-significant adverse effect on channel erosion and deposition in Segments 1, 2, 3A, and 3B, as described for the Guadalupe River Project with Bypass System Alternative. Implementation of the Refined Bypass System Alternative would have a less-than-significant adverse effect on channel erosion in the vicinity of New Julian Street Bridge. Relocating the recreation trail from under the bridge would eliminate the need for the channel armoring that would increase the conveyance capacity and reduce velocity. Reducing the channel velocity negates the need for the bank armoring at New Julian Street Bridge to prevent erosion.

The operation of the Refined Bypass System Alternative would result in the same changes in river morphology described for the Bypass System Alternative.

Determination: Implementation of the Refined Bypass System Alternative would have a less-than-significant adverse effect on river morphology.

5.3 Water Quality

This analysis of effects on water quality evaluates suspended solids, toxic constituents, temperature, and dissolved oxygen. The results of this analysis are presented below.

5.3.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of effects on water quality. These criteria are based on the CEQA Guidelines and CEQ's NEPA regulations. A significant effect on water quality would occur if construction and/or operation activities would:

- Violate any water quality standards or waste discharge requirements
- Substantially degrade surface water and/or groundwater quality
- Contaminate a public water supply
- Substantially increase suspended solids in and turbidity of the river
- Discharge contaminants into the river

5.3.2 No-Action Alternative

Construction- and operation-related disturbances of soil and sediment in Segment 3C Phase 2 have the potential to result in minor effects on water quality from possible temporary and intermittent increases in suspended solids, turbidity, biostimulatory nutrients (i.e., nitrogen, phosphorus), or release of hazardous materials from equipment operations (e.g., fuel, oil, grease) in the Guadalupe River.

These potential effects were evaluated by the Corps in previous environmental documents (U.S. Army Corps of Engineers, 1985). Measures in these documents to avoid or minimize potential adverse effects on aquatic resources were found to adequately mitigate the construction- and operation-related effects of the No-Action Alternative (Section 3.3.3, "Environmental Commitments"). These measures include an SWPPP, an erosion and

sediment management plan, and a spill prevention and response plan. New concerns have been raised by the San Francisco RWQCB regarding potential construction-related disturbances and exposure of mercury that was deposited in channel sediments due to historic mining activities in the upper Guadalupe River watershed. The Hazardous and Toxic Materials Contingency Plan and associated Soil Management Plan includes sampling and mitigation measures to reduce water quality impacts of this potentially toxic metal.

Detailed modeling of water temperature has not been conducted for the No-Action Alternative; therefore, potential changes in temperature under this alternative are not precisely known. Modeling of the Guadalupe River Project with Bypass System Alternative using the JSATEMP thermal model included the flood protection components of the No-Action Alternative; however, these components were not modeled separately from all components of the entire Guadalupe River Project. Although these modeling results include additional flood protection features, the results can be used to qualitatively estimate the temperature effects of the No-Action Alternative. Potential increases in water temperature under the No-Action Alternative are expected to be substantially less than under the Bypass System Alternative because more channel bed and riverbank armoring would be constructed in Segments 3A and 3B for the Guadalupe River Project with Bypass System Alternative. If the No-Action Alternative is selected, temperature and HEP modeling would be conducted to specifically quantify the project effects and determine mitigation measures needed to avoid, minimize, or compensate for the effects.

Extrapolating from the results of the thermal modeling for the Guadalupe River Project with Bypass System Alternative, it is expected that under the No-Action Alternative, water temperatures from I-280 through Reach A would be slightly higher than preproject temperatures for a number of years following construction of Segment 3C Phase 2. SRA cover and riparian vegetation would be planted in Segments 1, 2, 3A, and 3B; Reach A; and Guadalupe Creek to mitigate for shade lost as a result of these construction activities. This vegetation would begin to provide shade before year 5 and reach maturity and maximum shade density after year 40. Increasing shade along the Guadalupe River and Guadalupe Creek would lower water temperatures in the long term.

Determination: Adverse water quality effects would be less than significant. The construction- and operations-related sediment disturbances and potential effects from turbidity, suspended solids, hazardous construction materials, and mercury would be minimized through the implementation of pollution control plans. Postproject water temperature increases would be expected to be reduced over time as mitigation vegetation matures.

5.3.3 Bypass System Alternative

The Bypass System Alternative is the construction of a bypass in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, and additional offsite mitigation. The Guadalupe River Project with Bypass System Alternative is construction of the Bypass System Alternative and the operation of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass reach system.

Preproject and postproject water temperatures were simulated using the JSATEMP model (Appendix 1B.5). Measured water temperature data were not used in the impact assessment

because only intermittent water temperature data are available for the period prior to September 1995 and most of available measured water temperature data are for the period after construction in Segments 1 and 2. In addition, the difference in measured preproject and postproject water temperature would not clearly represent flood protection feature effects. Flow levels and weather, including humidity and solar radiation, are the primary variables affecting water temperature and are not affected by the flood protection features. Flow levels and weather vary from day to day and year to year. The JSATEMP model was used to simulate the effects of the Guadalupe River Project with Bypass System Alternative on water temperature. The simulation allows removal of the confounding effects of variable weather and flow levels, thereby permitting a clear representation of the effects of changes to stream geometry and heat transfer on water temperature resulting from the Guadalupe River Project with Bypass System Alternative.

The incremental effect of the Bypass System Alternative on temperatures and dissolved oxygen concentrations cannot be adequately evaluated in isolation from the effects contributed by the previously completed phases of the Authorized Project. For this reason, the effects on temperatures and dissolved oxygen concentrations are evaluated for the Guadalupe River Project with Bypass System Alternative. The incremental effects of the Bypass System Alternative on suspended solids and toxic constituents can be adequately evaluated, however, and are described for construction of Segments 3A and 3B.

5.3.3.1 Suspended Solids and Biostimulatory Nutrients

Construction Effects. Construction activities for the Bypass System Alternative would disturb streambank and channel soils and sediments in Segments 3A and 3B. These construction activities have the potential to increase sediment load to the river via overland runoff and direct deposition in the channel. Erosion at construction sites could also increase concentrations of suspended solids and of biostimulatory nutrients, such as phosphorus and nitrogen compounds, that are often attached to suspended particulate matter and contribute to increased water turbidity.

Any soil disturbance resulting from construction activities would be intermittent and temporary. In-channel construction will be limited to the low-flow period between April 15 and the end of October to minimize soil erosion. Channel segments undergoing instream construction activities will be dewatered by diverting the flow around the affected areas. Dewatering avoids direct discharges of disturbed soils and sediment to the river.

As described in Section 3.4.3.1, "Measures to Avoid and Minimize Adverse Project Effects During Construction," implementation of erosion control and hazardous material spills response plans under a San Francisco Bay RWQCB-approved NPDES stormwater permit, in conjunction with other preventive measures required by a CDFG Streambed Alteration Agreement, will prevent erosion and increases in suspended solids, biostimulatory nutrients, and turbidity. The SWPPP, erosion and sediment control plan, and spill prevention and response plan for the Bypass System Alternative would identify BMPs for avoiding water-quality effects. These measures may include, but are not limited to, the following: limiting the months when in-channel construction occurs; implementing soil stabilization measures; practicing good construction-site housekeeping; containing and isolating hazardous materials such as vehicle fuels and lubricants; and implementing

monitoring and adaptive management plans. The likelihood of adverse water-quality effects resulting from construction activities is therefore considered low.

Determination: Construction-related water quality effects would be less than significant. Sediment disturbances and potential impacts from turbidity, suspended solids, and biostimulatory nutrients would be minimized through the implementation of pollution control plans.

Operations Effects. As discussed in Section 5.2.3.2, "River Morphology," construction and operation of the Guadalupe River Project with Bypass System Alternative could change the location and pattern of channel erosion and bedload sediment deposition in segments of the Guadalupe River. As described in Section 4.2.1, "Sediment Load," wash load sediments are mobilized at relatively low stream flow velocities compared to the coarser bedload material. Operation of the bypasses would not change the frequency with which lower flows occur. Consequently, the wash load and suspended solids transported through the downtown reach would not change from existing conditions.

Determination: There would be no operations-related effects from transport of suspended sediments.

As discussed in Section 5.2.3.1, "Channel Erosion and Deposition," the operation of the Guadalupe River Project with Bypass System Alternative would not result in a substantial change in sediment deposition in or downstream from the project area. Small amounts of sediment would continue to accumulate in the project area after floodflows. SCVWD will continue to remove this accumulated sedimentfrom the project area as needed using the routine channel maintenance activities described in Section 3.4.4, "Operation and Maintenance." These routine channel maintenance activities include sediment removal and vegetation management, as well as woody debris removal and bank stabilization. This regular and periodic sediment-removal maintenance by SCVWD would be conducted in compliance with RWQCB requirements and follow standard Best Management Practices to avoid an increase in suspended solids or any other substantial adverse impacts on water quality.

As described in Section 1.6.15, "Santa Clara Valley Water District Stream Maintenance Report," these routine stream maintenance activities are part of SCVWD's Stream Maintenance Program. The Stream Maintenance Program Programmatic EIR will analyze potential water quality impacts from future routine channel maintenance activities, including those in the project area, and provide for appropriate mitigation for any adverse environmental effects. In the future, routine sediment removal and bank stabilization activities would be conducted in the project area to preserve the as-built design of the Guadalupe River Project with Bypass System Alternative. These future channel maintenance requirements would be stipulated in the project's Final Operation and Maintenance Manual, and would be conducted in compliance with the Stream Maintenance Program Programmatic EIR to avoid impacting water quality.

Implementation of the Guadalupe River Project with Bypass System Alternative is not expected to require channel maintenance activities different from those currently being conducted in the project area.

Determination: Significant adverse impacts on water quality are avoided by conducting channel maintenance activities in compliance with RWQCB requirements and following standard Best Management Practices. The effects of future routine channel maintenance activities in the project area will be addressed in the Programmatic EIR for the Santa Clara Valley Water District Stream Maintenance Program. Future channel maintenance in the project area is not expected to adversely impact water quality, but if potential adverse effects are identified in the Stream Maintenance Program Programmatic EIR, mitigation for those effects will be addressed in that Programmatic EIR.

5.3.3.2 Toxic Constituents – Accidental Spills of Construction Materials

Accidental spills of construction materials, such as concrete, fuels, oil, and sealants, are not expected. Careful adherence to the project's spill prevention and response plan will ensure that equipment is available, workers are trained, and a management system is in place to prevent or respond to accidental spills (Section 3.4.3, "Environmental Commitments"). The spill prevention and response plan defines requirements for storage, handling, and containment of hazardous materials to emphasize protection of water quality. Key components of the plan include stipulations that hazardous materials shall be stored and construction vehicles and equipment shall be maintained outside the river channel.

Determination: Construction of the Guadalupe River Project with Bypass System Alternative would have no adverse effect on water quality.

5.3.3.3 Toxic Constituents – Mercury

The Guadalupe River, its tributaries, and South San Francisco Bay are classified as impaired with regard to mercury contamination under Section 303(d) of the CWA. As described in Sections 1.5.3.1, "San Francisco Bay Regional Water Quality Control Board and State Water Resources Control Board," and 4.3, "Water Quality," a draft TMDL program and implementation plan have been developed for San Francisco Bay calling for a 92 percent reduction in the amount of mercury loading currently entering the bay from the Guadalupe River watershed.

The Bypass System Alternative would not change the quantity or patterns of mercury that enters the project area from the watershed. However, because of the association of mercury with soils and sediments (Section 4.3.2, "Toxic Constituents"), project construction activities and long-term operations of the project could affect transport and methylation of mercury in the Guadalupe River. Therefore, the Bypass System Alternative could potentially affect mercury behavior by:

- increasing the transport and loading of mercury to the San Francisco Bay, and
- increasing the formation of methyl mercury in the project reach of the Guadalupe River.

Transport and Loading. Construction activities have the potential to disturb soil and sediments that contain mercury. Operation of the bypasses could cause scour and sediment deposition resulting in transport of mercury associated with bedload and washload sediments. In addition, long-term sediment removal operations could disturb substrate that contains mercury.

During project construction, construction-related erosion and sedimentation would be managed through implementation of an erosion and sediment control plan. As described in Section 3.4.3, "Environmental Commitments," the erosion and sediment control plan would outline procedures and policies to avoid and minimize the discharge of sediment to the Guadalupe River during construction activities. As described in Section 3.4.3, elements of the erosion and sediment control plan would require contractors to:

- conduct all construction work in accordance with site-specific construction plans that minimize the potential for sediment input to the stream
- identify, with construction fencing, all areas that require clearing, grading, revegetation, or recontouring and minimize the extent of areas to be cleared, graded, or recontoured
- grade spoil sites to minimize surface erosion and apply erosion control measures as appropriate to prevent sediment from entering water courses or the stream channel, to the extent feasible
- mulch disturbed areas, as appropriate, and plant with appropriate species as soon as practicable after disturbance
- avoid operating equipment in flowing water by using temporary cofferdams or some other suitable diversion to divert channel flow around the channel and bank construction area

In addition, a soil management plan would be implemented for the Guadalupe River Project with Bypass System Alternative that would provide procedures for classifying soils, as well as procedures and criteria for disposal and reuse. Prior to project implementation, the soil management plan will be updated to reflect final project design and to incorporate input from RWQCB regarding management of soils containing elevated mercury concentrations. The updated soil management plan will be submitted to RWQCB for approval prior to implementation.

The following restrictions on soil management would be included in the soil management plan submitted to RWQCB for approval:

- Sediments with mercury concentrations that exceed hazardous waste criteria under federal or state law must be disposed offsite in appropriately licensed disposal sites. The determination of hazardous properties shall comply with all applicable statutes and regulations pertaining to hazardous wastes.
- Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 mg/kg may not be reused onsite unless such soils are placed above the low flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur; above the water surface elevation defined by the 3-year recurrence interval.
- Excavated surfaces above the 3-year recurrence interval elevation that contain mercury concentrations higher than hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for onsite reuse. Excavated surfaces below the 3-year recurrence interval elevation which contain mercury concentrations greater than 1 mg/kg will be overexcavated and replaced with clean imported soil.

- The limitations on onsite reuse of excavated soils and sediments would also apply to operation and maintenance activities throughout the life of the proposed project.

The 1 mg/kg requirement is based on regulatory guidance from RWQCB (California Regional Water Quality Control Board, 2000), which states that reducing bank sediment concentrations of mercury to 1 mg/kg or less will reduce water column concentration of total recoverable mercury. Water quality in the project area presently exceeds Basin Plan numeric water quality objectives for mercury. Therefore, incorporation of the proposed soil reuse restrictions would result in improved water quality under postproject conditions.

If the 30,000 cubic yards of channel sediment, which will be excavated as part of the Guadalupe River Project, were disposed out of the active channel or offsite, approximately 350 pounds (145 kg) of mercury would be removed from the Guadalupe River (Section 5.3.3.3, "Toxic Constituents"). This assumes the channel sediment has an average mercury concentration equal to that measured in the early 1990s (4.2 mg/kg). From RWQCB estimates, the annual wastewater load of mercury for the entire San Francisco Bay is 20 to 50 kg per year. Implementation of the Soil Management Plan could have a significant beneficial impact on mass loading to the Bay.

During operation of the project, project elements such as channel armoring and riparian vegetation plantings would further contribute to mercury transport management. Existing erosion during the operation of the project would be eliminated in areas of the river that would be armored and erosion would be reduced or eliminated in areas where riparian vegetation is planted. In addition, implementation of erosion control monitoring as part of the Mitigation Monitoring Program (Volume 2, Appendix 3, Section 4.3.4.7, "Bank Stability Indicator for SRA Cover," and Section 4.3.4.9, "Channel Bottom Stability Indicator for SRA Cover") would provide a method of identifying areas of bank instability, erosion that would require subsequent remedial action. Control of operational erosion would also manage the transport of mercury bound to eroded sediments.

Determination: In addition to channel armoring and riparian vegetation planting, the implementation of erosion and sediment control, soil management, and mitigation monitoring plan would avoid and minimize the potential for increased transport and loading of mercury to the San Francisco Bay. Disturbance and subsequent transport of mercury-laden sediments and soils is an identifiable source of mercury loading to the San Francisco Bay. The erosion control measures contained in the erosion and sediment control plan and the Mitigation Monitoring Plan along with channel armoring and riparian vegetation planting could substantially manage project-related erosion, thereby minimizing project effects. Furthermore, the soil management plan would establish threshold criteria whereby mercury-laden soils would be removed from the channel. Together these measures could significantly contribute to the overall reduction in the available mercury that is mobile in the project reach. In particular, the implementation of a soil management plan (Section 3.4.3, "Environmental Commitments") could result in significant exports of mercury from project reaches to licensed disposal facilities. Therefore, the effects of construction- and operations-related transport and loading of mercury to the San Francisco Bay are considered less than significant.

Increased Methyl Mercury Formation. Any potential increase in the exposure of aquatic organisms to bioavailable mercury would be considered an adverse water quality effect of

the Guadalupe River Project with Bypass System Alternative. However, there is no evidence to suggest that operation of the Guadalupe River Project with Bypass System Alternative would increase aquatic organism exposure. To the contrary, the proposed project would discourage the development of instream conditions such as wetlands or other anoxic, high sulfate, low pH, and high organic matter aquatic environments that would be conducive to enhanced methylation. In addition, by creating a better defined low flow channel, the project would create more concentrated and less stagnant flows, thereby resulting in reduced anoxic conditions.

Determination: The Guadalupe River Project with Bypass System Alternative is not expected to increase the potential for formation of methyl mercury in the Guadalupe River watershed. Because stagnant or anoxic conditions would be avoided or minimized by concentrating flow in a defined low flow channel, the Guadalupe River Project with Bypass System Alternative would not be expected to increase the exposure of aquatic organisms to bioavailable methyl mercury. Therefore, increased methyl mercury formation is considered a less-than-significant adverse affect. However, SCVWD and the Corps would implement the following mitigation measure to minimize the potential for increased methylation and to provide valuable data for the TMDL effort on the Guadalupe River.

As part of the Guadalupe River watershed monitoring program specified as a mitigation component in Section 6.2.4.3 "Toxic Constituents – Mercury," SCVWD, in conjunction with RWQCB and other resource regulatory agencies, would develop and implement a program to monitor postproject changes in methylation rates in Segments 1, 2, and 3 and Reach A. Baseline monitoring would be conducted prior to project construction. Additional monitoring would be conducted for a period of 5 years.

A comparison of baseline and postconstruction data would show whether preconstruction levels of methyl mercury in the project reach have elevated above baseline conditions. If monitoring showed elevated methyl mercury concentrations, efforts would be conducted to determine conditions responsible for this increase. SCVWD would then consult with the RWQCB and other agencies to identify and implement additional measures to reduce controllable factors responsible for the observed elevation in methyl mercury.

5.3.3.4 Water Temperature

The potential changes in water temperature were evaluated with the JSATEMP model. Appendix 1B describes the JSATEMP model and the use of temperature simulations to assess potential thermal effects. Temperature was simulated in JSATEMP for 1991 conditions prior to construction of the Authorized Project (preproject), conditions expected immediately following construction of the Guadalupe River Project with Bypass System Alternative (postproject), and conditions expected after the 40-year maturation of SRA cover vegetation (postmitigation). Modeling of postproject effects assumed that all elements of the Guadalupe River Project with Bypass System Alternative would be constructed simultaneously. However, Segments 1 and 2 were completed in 1994 and 1996, respectively, and SRA cover vegetation has already reestablished some of the shade removed during that construction. Therefore, the actual postproject effect of the Guadalupe River Project with Bypass System Alternative on water temperature will be less than that indicated by the JSATEMP simulation.

Water temperatures were simulated for two types of years to analyze project effects: a wet year and a dry/median year. These two types of years were chosen to represent the range of flow conditions that may occur in the Guadalupe River. Streamflow data from 1995 were used to simulate the wet year. A composite historic data set was used to simulate the dry/median year based on consultation with SCVWD and the Corps.

The significance of potential changes in water temperature was evaluated using the 2.8 °C (5 °F) threshold of the San Francisco Bay Basin Plan (Section 4.3.3, "Water Quality-Temperature"). The Basin Plan does not provide clear guidance on procedures for applying the 2.8 °C (5 °F) threshold. In this evaluation, the threshold was applied to average maximum water temperatures (which are expected to increase more than average temperatures) in the Guadalupe Creek mitigation site, Segment 3, Segments 1 and 2, and the Reach A mitigation site (Appendix 1B, Section 1B.5 "Temperature Simulations").

Measured water temperature data were not used in the assessment of effects because only intermittent water temperature data are available for the period prior to September 1995 and most of the available measured water temperature data are for the period after construction in Segments 1 and 2. In addition, the difference in measured preproject and postproject water temperature would not clearly represent project effects. Flow levels and weather, including humidity and solar radiation, are the primary variables affecting water temperature and are not affected by the project. Flow levels and weather vary from day to day and year to year. The simulation allows removal of the confounding effects of variable weather and flow levels, thereby permitting a clear representation of the effects of changes to stream geometry and heat transfer on water temperature.

The JSATEMP modeling conducted for the analysis provided data for identifying several general temperature impact mechanisms in the Guadalupe River. Increases in water temperatures are primarily caused by decreases in the amount of SRA cover vegetation along the streambanks of the river. Decreases in streamflow also increase water temperature; temperature increases occur particularly in summer when streamflows are relatively low. Because simulated postproject temperature increases compared to preproject conditions were large for the dry/median year than for the wet year, only results for the dry/median year are presented here.

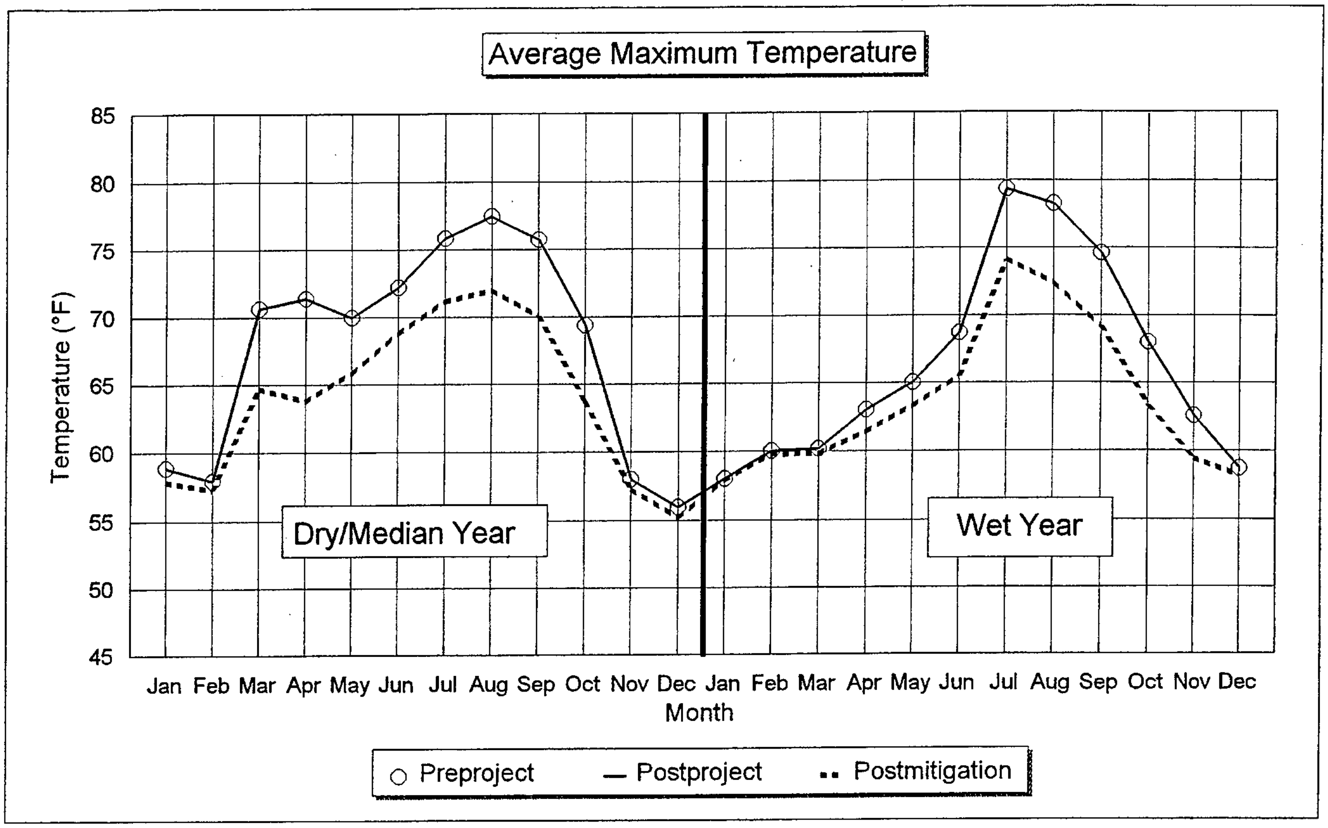
Figures 5.3-1 through 5.3-4 show the monthly average and average maximum water temperatures simulated for the Guadalupe Creek mitigation site, Segment 3, Segments 1 and 2, and the Reach A mitigation site, respectively. In Guadalupe Creek, postproject temperatures remained the same as preproject temperatures because no vegetation removal or changes to the channel shape would occur (Figure 5.3-1). Postproject water temperatures would increase in the downtown area because riparian vegetation would be removed. Less shaded reaches would gain more heat in the summer than more shaded areas. Postproject average maximum monthly water temperatures would increase by 4.3 °F during August of the dry/median year (Figure 5.3-2). These temperature increases would not exceed the 5 °F Basin Plan water quality objective (Section 4.3.3, "Temperature"). The largest postproject temperature increases would occur in Segments 1 and 2 during August of the dry/median year; average monthly maximum temperature would increase by 6.3 °F, which is higher than the 5 °F Basin Plan objective; average monthly temperature would increase by 4.7 °F (Figure 5.3-3). Although no construction would occur in Reach A, postproject temperatures

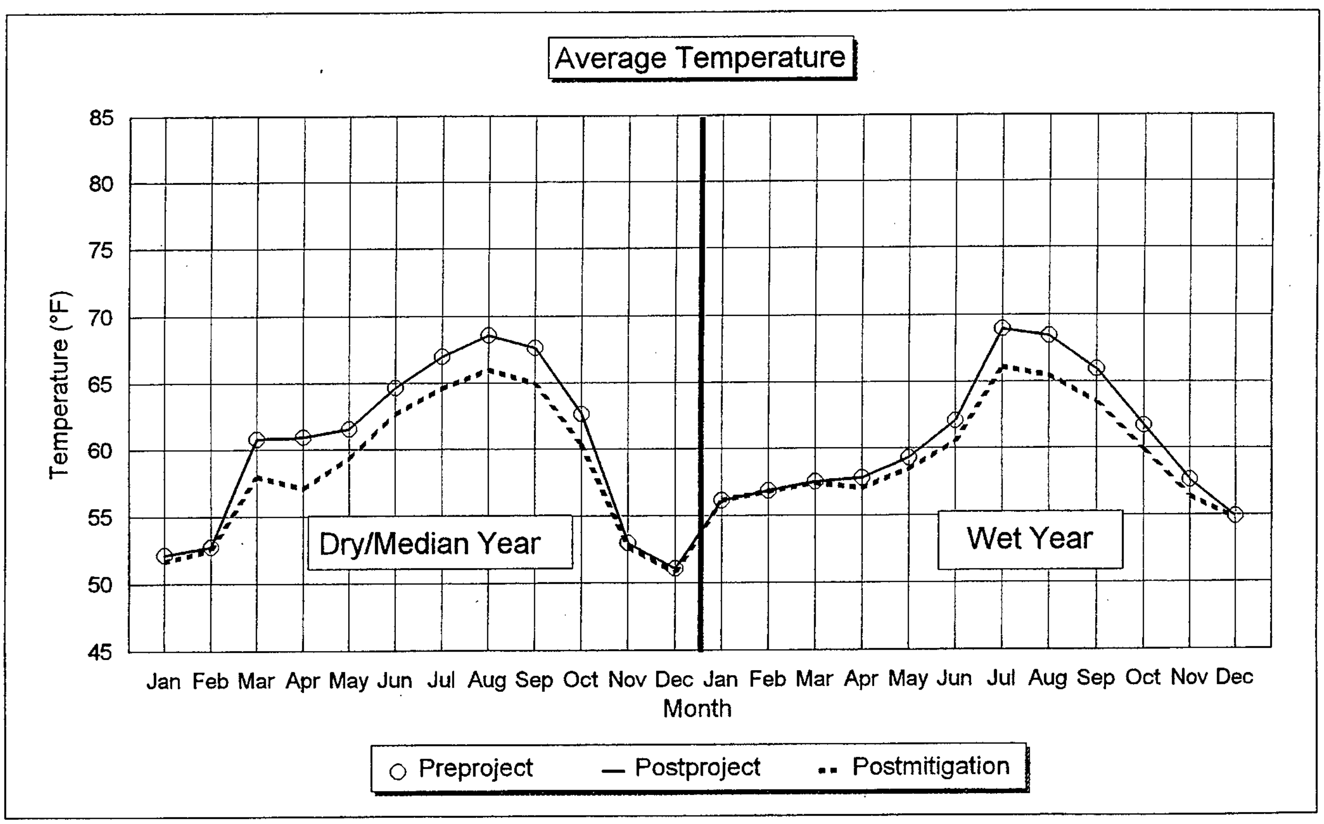
would also be higher than preproject temperatures by 2.2 °F in Reach A because warmer water would enter the reach from the upstream construction site areas of Segments 3, 2, and 1 (Figure 5.3-4). Section 5.6, "Biological Resources – Fish," of this Report addresses the effects on steelhead and chinook salmon that would result from the potential changes in water temperature.

Figure 5.3-5 shows the simulated preproject, postproject, and postmitigation water temperatures for each JSATEMP model segment of Guadalupe Creek and the Guadalupe River during only August of a dry/median year when seasonal water temperatures are typically the warmest. Figure 5.3-5 identifies the specific locations of the largest project-related temperature effects and provides more detail than the average temperatures for each segment shown in Figures 5.3-1 through 5.3-4. Simulated average maximum postproject temperatures would increase between Woz Way and Santa Clara Street (model segments 31 and 32) compared to preproject conditions due to vegetation removal and channel and riverbank armoring in Segment 3C. Water temperatures between Park Avenue and Santa Clara Street in Segment 3B (model segment 32) would increase by 6.0 °F compared to preproject temperatures and exceed the 5 °F Basin Plan water quality objective for allowable temperature increases. The largest postproject average maximum temperature increase of 8.3 °F would occur between the Hedding Street and the I-880 bridges (model segment 37) in Segment 1. In Reach A, postproject average maximum temperatures would be 2.2 °F higher than Reach A preproject temperatures. The postproject average maximum water temperature in the last model segment, which is representative of water flowing downstream from U.S. Highway 101, would be 0.9 °F higher than the preproject temperature.

Although some of the postproject increases in temperatures are expected to be higher than the Basin Plan temperature objective of 5 °F immediately after the completion of construction activities that remove riparian vegetation along the riverbanks, increases would be temporary. New SRA cover vegetation and riparian vegetation planted for project mitigation would begin to reduce water temperatures from the postproject peak values as soon as they begin to provide shade to the water surface, approximately five years following construction. Increased shading as SRA cover vegetation mitigation matures accounts for almost all decreases from preproject water temperatures. More SRA and riparian vegetation will be planted than is being removed by the project. The Guadalupe River Project with Bypass System Alternative will provide a net increase in shade after vegetation matures.

After mitigation vegetation planted along Guadalupe Creek matures, the average maximum monthly temperature for the entire Guadalupe Creek reach during August of the dry/median year would be 5.5 °F lower than the preproject temperature (Figure 5.3-1). At isolated areas within the Guadalupe Creek reach, average maximum temperatures would drop by as much as 7.6 °F and average temperatures would drop by as much as 3.9 °F during April (Figure 5.3-5). Following full maturation of the onsite mitigation vegetation in Segments 1, 2, and 3, average maximum temperatures for postmitigation conditions are expected to remain higher than preproject conditions by approximately 3.5 °F in Segment 3 and 2.5 °F in Segments 1 and 2 (Figure 5.3-2 and 5.3-3). Postmitigation temperatures in Reach A would be lower than under preproject conditions by 1.8 °F (Figures 5.3-4 and 5.3-5). Approximately 4.4 miles of channel are expected to have postmitigation temperatures lower

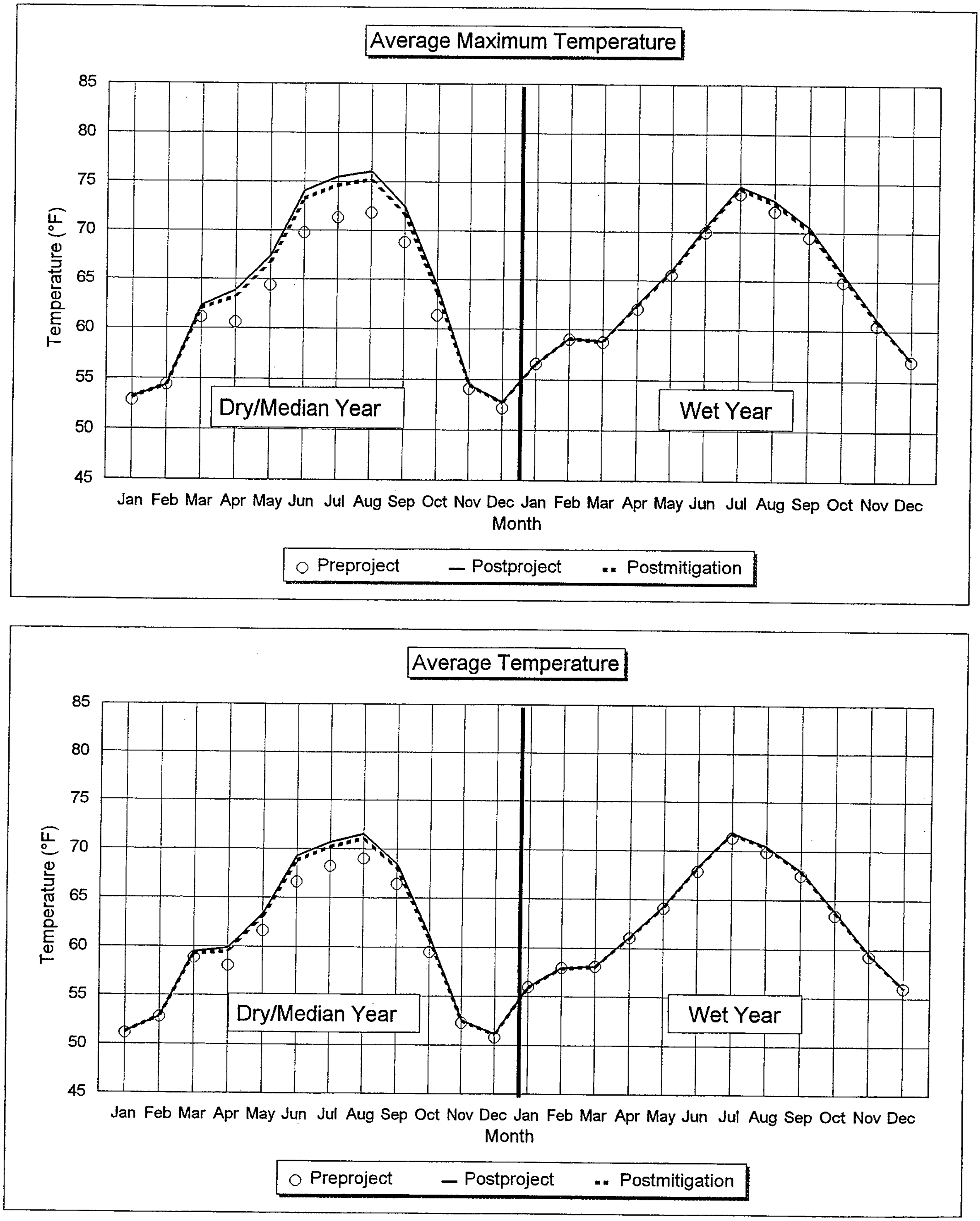




Preproject = 1990 conditions; Postproject = year 0 after construction; Postmitigation = year 40 after construction

Revised

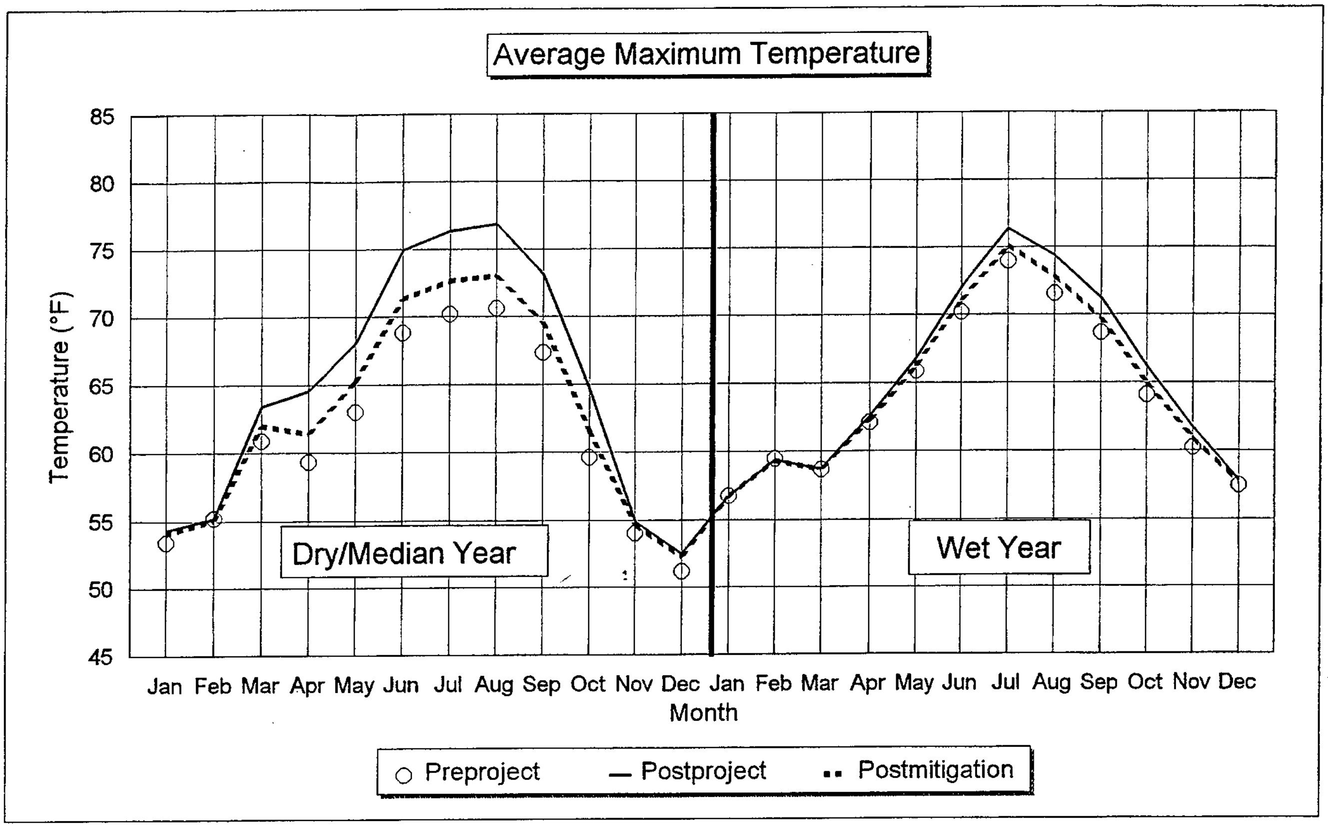
Figure 5.3-1 Simulated Temperatures in Guadalupe Creek for the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative

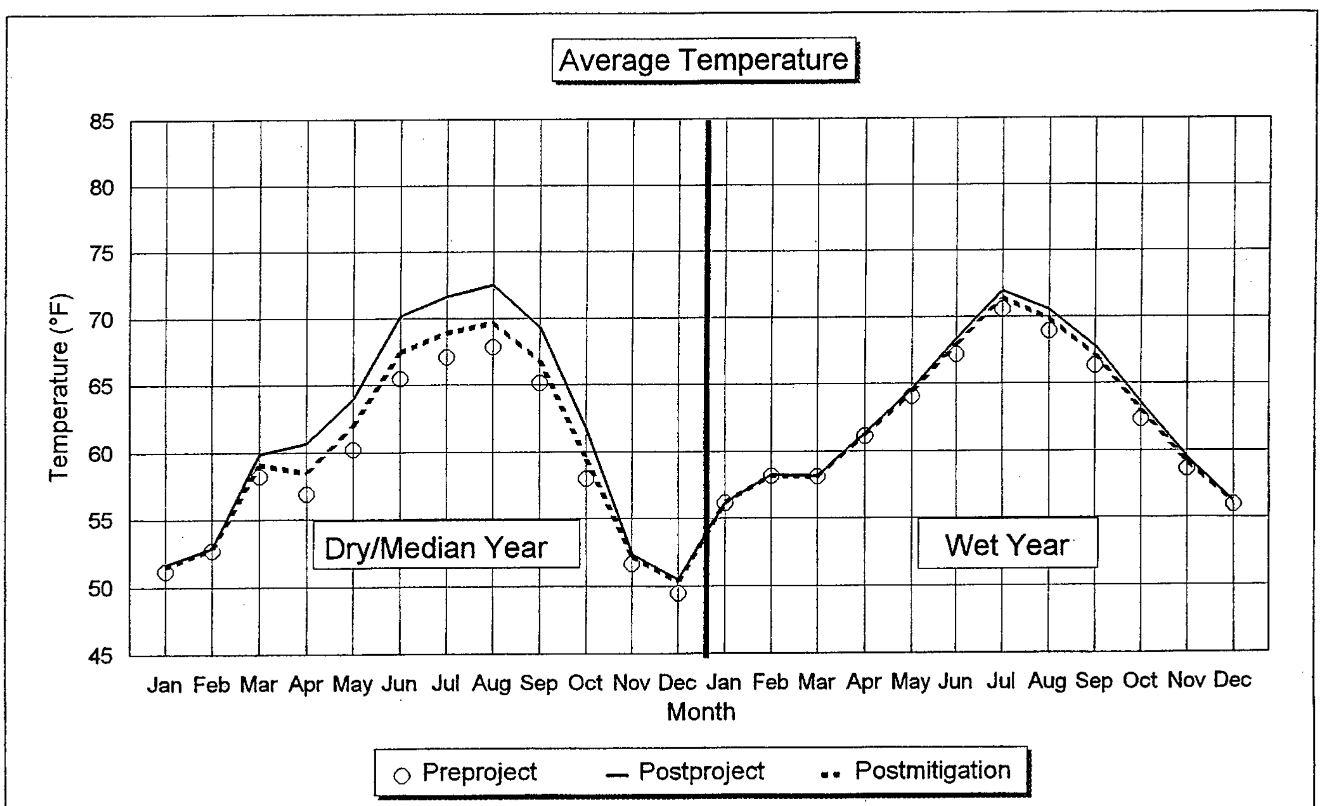


Preproject = 1990 conditions; Postproject = year 0 after construction; Postmitigation = year 40 after construction

Revised

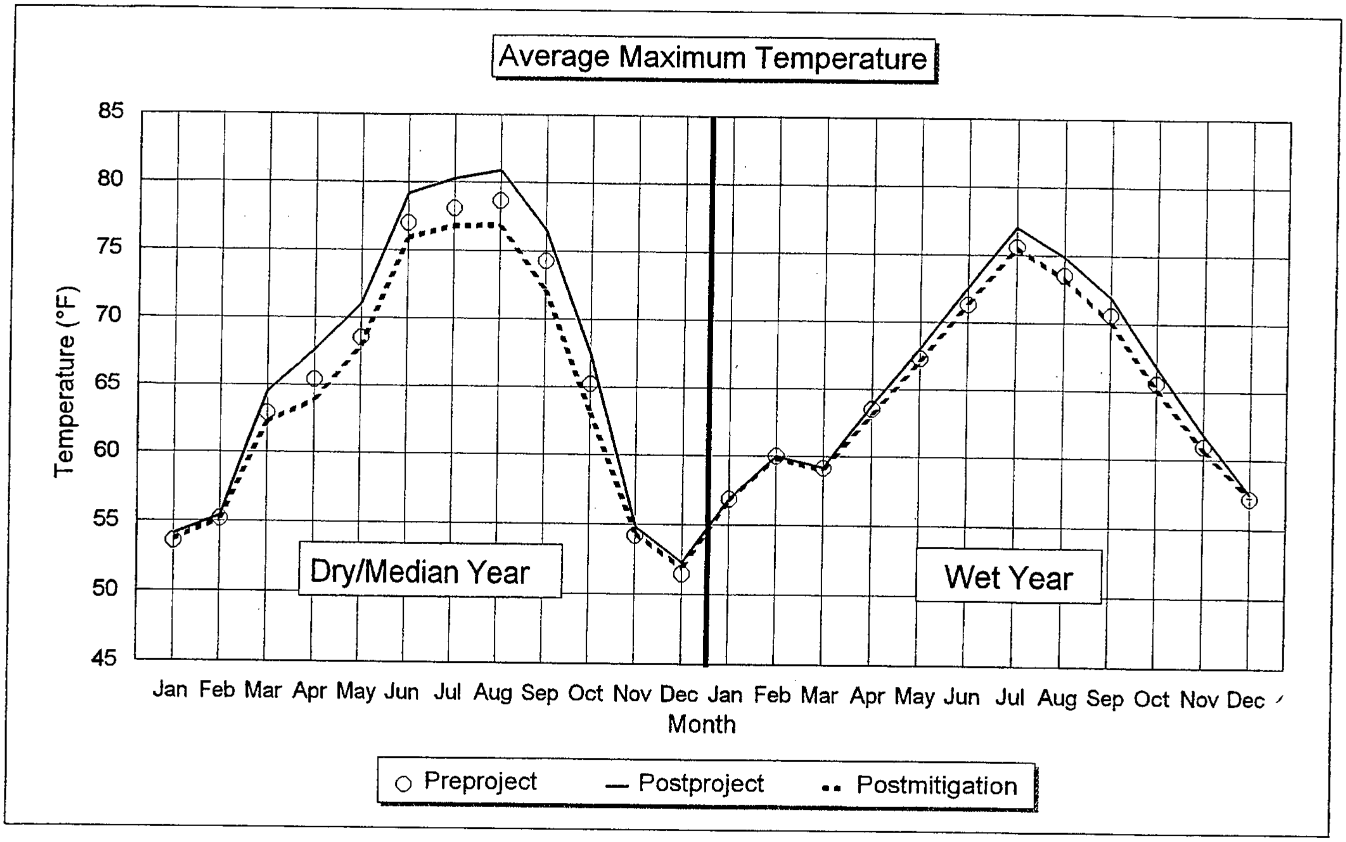
Figure 5.3-2 Simulated Temperatures in Segment 3 for the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative

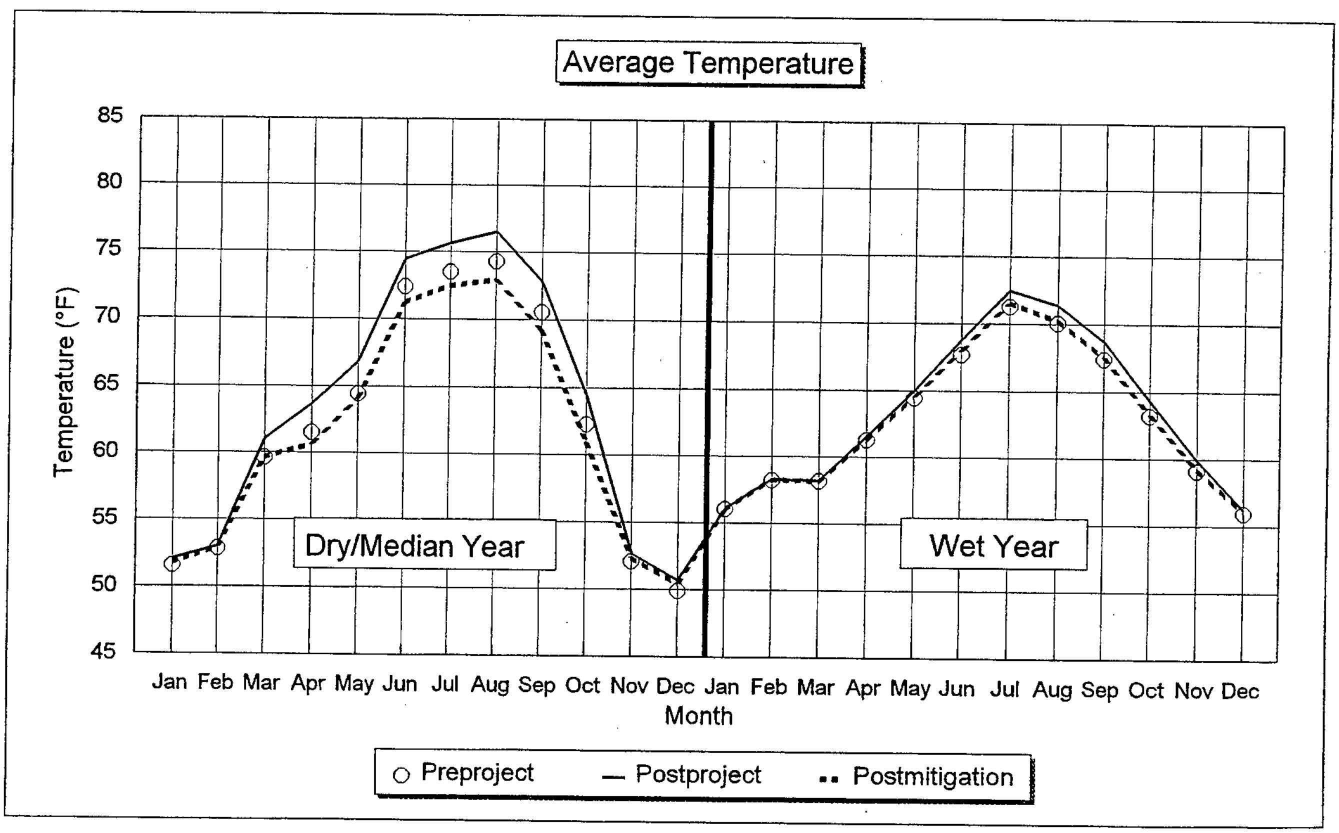




Preproject = 1990 conditions; Postproject = year 0 after construction; Postmitigation = year 40 after construction *Revised*

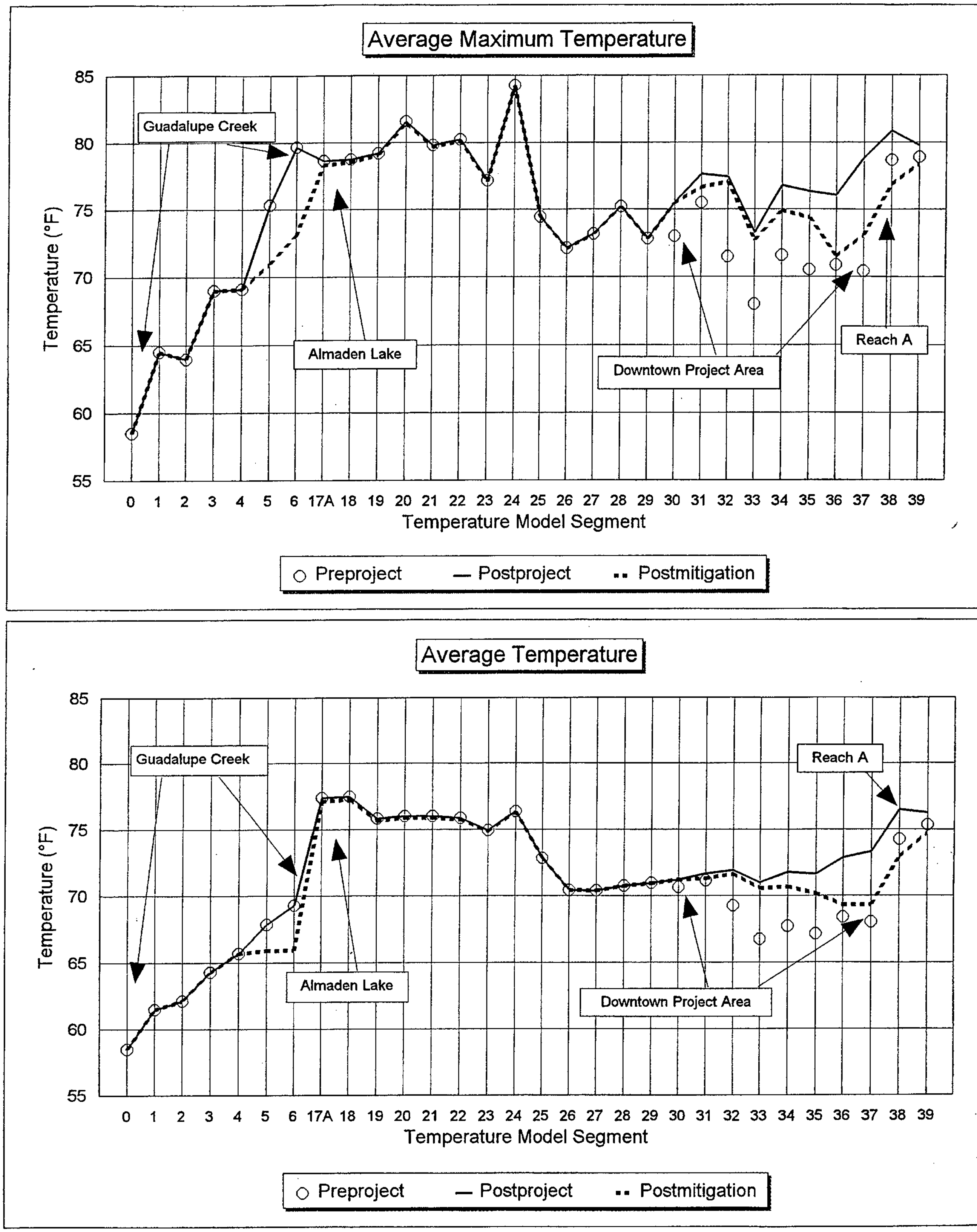
Figure 5.3-3 Simulated Temperatures in Segments 1 and 2 for the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative





Preproject = 1990 conditions; Postproject = year 0 after construction; Postmitigation = year 40 after construction *Revised*

Figure 5.3-4 Simulated Temperatures in Reach A for the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative



Preproject = 1990 conditions; Postproject = year 0 after construction; Postmitigation = year 40 after construction *Revised*

Figure 5.3-5 Simulated Temperatures for August of the Dry/Median Year for the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative

The potential Guadalupe Creek mitigation site is represented by model segments 5-6; Segments 1, 2, and 3 of the Guadalupe River Project include model segments 30-37; and Reach A consists of model segments 38-39.

than preproject temperatures. Only 2.6 miles of channel are expected to have postmitigation temperatures higher than preproject temperatures.

The low-flow channels in the armored areas of Section 3C are designed to maintain deeper and narrower flows during low-flow conditions compared to preproject channel form conditions. In addition, the invert stabilization structures in the natural channel of Segments 3A and 3B will function to narrow the natural low-flow channel, cause the natural low-flow channel to meander, and create small plunge pools. As described in Section 4.3, "Water Quality," narrower and deeper channels such as these will gain less heat and have lower temperatures relative to wider and shallower channel configurations such as those found under preproject conditions.

Determination: Increases in postproject water temperature would be a significant adverse effect because changes in postproject temperatures in some stream sections may be higher than the Basin Plan temperature objective of 2.8 °C (5 °F) immediately after completion of construction activities. The effects, however, would be temporary. Onsite and offsite SRA cover vegetation that will be planted as part of the MMP will compensate for the temporary postproject temperature increases. Postmitigation impacts are less than significant.

Determination: Postmitigation water temperatures that remain higher than preproject temperatures in Segments 1, 2, and 3 and Reach A after mitigation vegetation matures are less-than-significant adverse effects because increases are lower than the Basin Plan water quality objective of 5 °F for allowable temperature increases.

5.3.3.5 Dissolved Oxygen

Dissolved oxygen levels could be affected by changes in temperature within the project area because the solubility of dissolved oxygen in water is related to temperature. The temperature effects described above are not expected to result in an appreciable reduction of dissolved oxygen in Guadalupe River water. The projected average maximum monthly increase in water temperature of 6.3 °F during August of the dry/median year type would reduce the dissolved oxygen content by only 0.5 mg/L. USGS monitoring data indicate that the dissolved oxygen levels in the river are generally high and suitable for aquatic life, and a 0.5-mg/L change is within the natural daily variability of dissolved oxygen presently experienced by aquatic organisms. Furthermore, the small project effect on dissolved oxygen would decline over time as SRA cover vegetation matures and water temperatures decrease from their postproject maximum values. The effect of the Bypass System Alternative on dissolved oxygen content in the Guadalupe River is considered less than significant.

Determination: Water quality effects from reductions in dissolved oxygen would be a less-than-significant adverse effect because they would be small and temporary.

5.3.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would include the same environmental

commitments identified for the Bypass System Alternative (Section 3.4.3, "Environmental Commitments").

The potential for construction of project features to affect water quality under the Refined Bypass System Alternative would be nearly identical to those described for the Bypass System Alternative. Effects on water temperature are expected to be similar to that of the Bypass System Alternative (Figures 5.3-1 to 5.3-5) because riparian vegetation and SRA cover vegetation would be reduced by only 0.35 acre and 72 lf, respectively. Environmental commitments concerning water temperature that are described for the Bypass System Alternative would also be required under the Refined Bypass System Alternative.

Determination: The potential water quality effects under the Refined Bypass System Alternative would be very similar to those of the Guadalupe River Project with Bypass System Alternative. Adverse effects on water quality would be less than significant with implementation of the environmental commitments described in Section 3.4.3, "Environmental Commitments."

5.4 Biological Resources – Vegetation

The analysis of effects on vegetation includes an assessment of riparian vegetation, SRA cover vegetation, wetlands, and ruderal scrub and ruderal herbaceous vegetation. The results of this analysis are presented below.

5.4.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of effects on vegetation. These criteria are based on the CEQA Guidelines and the CEQ's NEPA regulations. Construction and operation activities would result in a significant effect on vegetation if any of the following were to occur:

- Substantial permanent loss of riparian vegetation or riparian habitat
- Substantial permanent loss of wetland vegetation or wetland habitat
- Direct mortality, permanent habitat loss, or lowered reproductive success for
  - individuals of State or federally listed threatened or endangered plant species or candidates for Federal listing or
  - substantial portions of local populations of plant species that are candidates for State or Federal listing or species identified by the California Native Plant Society (CNPS) (Skinner and Pavlik, 1994) as rare, threatened, or endangered in California or elsewhere (California Native Plant Society List 1b species)

Riparian vegetation along the Guadalupe River consists of native and nonnative trees and shrubs. Any loss of this riparian vegetation would be considered significant, regardless of whether the vegetation is native or nonnative, because it is one of the last remaining areas of riparian habitat in Santa Clara County. Riparian vegetation along the Guadalupe River provides SRA cover vegetation habitat. The loss of SRA cover vegetation would be

considered significant because this vegetation serves to maintain cooler water temperatures and to provide instream cover and helps to maintain bank stability.

Effects are considered less than significant if they do not meet any of the criteria identified above.

Natural recovery time was also considered when determining the significance of effects. For example, effects on upland vegetation are not considered significant because the vegetation recovery periods are expected to last only a few years. However, because riparian vegetation is expected to take several decades to mature and provide a significant amount of SRA cover vegetation, the loss of riparian vegetation is considered significant.

5.4.2 No-Action Alternative

The No-Action Alternative includes previously constructed floodplain terraces on the west side of the river in Segments 1 and 2; channel bed and bank armoring upstream from, under, and downstream from I-880; channel bed and bank armoring downstream from Coleman Avenue; and flood protection features, excluding flood training walls, in Segment 3C. The No-Action Alternative includes onsite riparian and SRA cover vegetation mitigation plantings in Segments 1 and 2.

5.4.2.1 Riparian Vegetation

Construction in Segments 1, 2, and 3C Phase 1 has resulted in the loss of 6.78 acres of riparian habitat, and the construction of Segment 3C Phase 2 will result in the loss of 1.58 acres of riparian habitat; the loss of riparian habitat totals 8.36 acres (Table 5.4-1). The Corps and USFWS performed a HEP analysis to determine the mitigation needed for riparian vegetation effects expected under the Authorized Project (U.S. Army Corps of Engineers, 1991). The HEP analysis concluded that 21.0 acres of riparian vegetation plantings were required to compensate for the 14.12 acres of riparian effects expected with the Authorized Project.

To date, 21.0 acres of riparian vegetation have been planted in Segments 1 and 2 (Table 5.4-2). In 1994, approximately 4.0 acres of native riparian vegetation were planted in the floodplain terrace on the west side of the river in Segment 1. In 1998, approximately 17.0 acres of native riparian vegetation were planted in the floodplain terrace on the west side of the river in Segment 2. The direct loss of 8.36 acres of riparian vegetation has been fully compensated for by the planting of 21.0 acres of riparian vegetation (U.S. Army Corps of Engineers, 1992).

To ensure that the compensatory riparian vegetation mitigation plantings are successful, the Corps and SCVWD will implement the riparian vegetation mitigation program described in the MMP (Appendix 3). Riparian vegetation compensatory mitigation will include monitoring the 21.0 acres that have already been planted on the floodplain terrace in Segments 1 and 2. Detailed information on the monitoring of survival, health and vigor, natural recruitment, vegetative cover, nonnative species cover, tree height, and tree basal area is provided in Section 4.2, "Riparian Vegetation," in the MMP (Appendix 3).

TABLE 5.4-1. Summary of Effects on Vegetation for the No-Action Alternative
The greatest loss of riparian vegetation and SRA cover vegetation has occurred in Segment 2

	Riparian Vegetation (ac)[a]		Other Waters of the United States (ac)		SRA Cover Vegetation (lf)	
Project Segment	**Preproject**	**Affected**	**Preproject**	**Affected**	**Preproject**	**Affected**
Segment 1	2.82[b]	1.31[b]	1.22[e]	1.22[e]	2,402	1,510
Segment 2	12.21[c]	5.13[c]	2.94[e]	2.94[e]	6,252	2,060
Segment 3C						
Phase 1	0.34[d]	0.34[d]	N/A[f]	N/A[f]	183	183
Phase 2	1.58[d]	1.58[d]	1.40[e]	1.40[e]	919	773
Total	**16.95**	**8.36**	**5.56[e]**	**5.56[e]**	**9,756**	**4,526**

Preproject riparian canopy mapping assumed that native and nonnative trees and shrubs growing on or near the top of bank and connected to the riparian canopy were included in the original riparian habitat mapping performed for the 1992 Mitigation and Monitoring Plan. The 1992 Mitigation and Monitoring Plan identified approximately 32 acres of riparian vegetation, including vegetation along the Woz Way to Park Avenue bypass reach, which is no longer considered part of the project.

[b] Preproject conditions for Segment 1 were mapped on Plates 1 and 2 of the 1992 Mitigation and Monitoring Plan (east bank) and on an orthophoto contour map blueline (west bank). The photo date is not known, but the photographs reflect preproject conditions. Postproject conditions were mapped on bluelines dated August 15, 1996. Postproject conditions were verified in the field on June 16, 1999.

[c] Preproject conditions for Segment 2 were mapped on bluelines dated October 27, 1990. Postproject conditions were mapped on bluelines dated August 15, 1996. Postproject conditions were verified in the field on June 16, 1999.

[d] Preproject conditions for Segment 3C were mapped on bluelines dated October 27, 1990 (downstream from I-280) and November 3, 1990 (upstream from I-280).

[e] The estimated preproject and affected acreage of other waters of the United States in Segments 1, 2, and 3C Phase 2 was based on surveys conducted in April 2000. Other waters of the United States in Segments 1, 2, and 3C consist of open water channel.

[f] Segment 3C Phase 1 includes the east bank. No waters of the United States are located in Segment 3C Phase 1.

Note: There are no wetlands in Segment 3C. No wetlands were identified in Segments 1 and 2 during preconstruction surveys (U.S. Army Corps of Engineers, 1985).

As described in Chapter 3, a vegetation protection plan will be implemented to protect riparian vegetation outside of the construction area during the construction of Segment 3C Phase 2.

Determination: The loss of riparian vegetation as a result of the No-Action Alternative would be a less-than-significant adverse effect because of the planting of compensatory vegetation and ongoing monitoring.

5.4.2.2 Shaded Riverine Aquatic Cover Vegetation

Construction in Segments 1, 2, and 3C Phase 1 has resulted in the loss of 3,753 lf of SRA cover vegetation, and construction of Segment 3C Phase 2 will result in the loss of 773 lf of SRA cover vegetation. The No-Action Alternative will result in the overall loss of 4,526 lf of SRA cover vegetation (Table 5.4-3).

A HEP analysis has not been performed to determine the amount of SRA cover mitigation necessary to fully compensate for losses that occur under the No-Action Alternative. However, a multiagency HEP analysis was used to determine mitigation for the effects of

TABLE 5.4-2. Riparian Habitat Affected by the No-Action Alternative (acres) and Riparian Vegetation Planted as Mitigation
The amount, location, and timing of effects on riparian habitat and riparian mitigation are compared. Segment 2 experienced the greatest loss of riparian vegetation and also accounted for the largest amount of riparian mitigation plantings.

	Riparian Effects by Construction Start Date						
Project Segment	**1992**	**1994**	**1998**	**1999**	**2000**	**2001**	**Total Effects**
Segment 1	1.31						1.31
Segment 2		5.13					5.13
Segment 3C Phase 1				0.34			0.34
Segment 3C Phase 2					1.58		1.58
Total	**1.31**	**5.13**		**0.34**	**1.58**		**8.36**

	Riparian Mitigation by Planting Start Date					
Mitigation Areas	**1992**	**1994**	**1998**	**1999**	**2000**	**Total Mitigation**
Segment 1		1.7		2.3		4.0
Segment 2			17.0			17.0
Segment 3						0
Reach A Mitigation Site						0
Guadalupe Creek Mitigation Site						0
Total		**1.7**	**17.0**	**2.3**		**21.0**

SRA cover vegetation losses for the Guadalupe River Project with Bypass System Alternative (Appendix 3). If the No-Action Alternative is selected, a HEP analysis will be conducted for the No-Action Alternative to determine the amount of SRA cover vegetationplantings necessary to mitigate for the effects of the No-Action Alternative. SRA cover vegetation effects would be 3,861 lf less than those expected to result from the Guadalupe River Project with Bypass System Alternative, so the SRA cover vegetation mitigation requirement would likely be slightly less than the 22,836 lf calculated for the Guadalupe River Project with Bypass System Alternative. Although the mitigation requirement would likely be less, planting SRA cover vegetation mitigation would still be required in Segments 1, 2, and 3; the Reach A mitigation site; and the Guadalupe Creek mitigation site. Additionally, the monitoring requirements would not change from those identified in the MMP (Appendix 3).

In 1998, approximately 3,006 lf of SRA cover vegetation was planted offsite in the Woz Way to Park Avenue bypass reach and at the Reach A and Guadalupe Creek mitigation sites. With the proposed MMP, there would be no net loss of SRA cover vegetation quantity or value if the No-Action Alternative is selected.

TABLE 5.4-3. SRA Cover Vegetation Affected under the No-Action Alternative (lf)

Project Segment	SRA Cover Vegetation Effects by Construction Start Date					
	1992	1994	1999	2000	2001	Total Affected
Segment 1	1,510					1,510
Segment 2		2,060				2,060
Segment 3C Phase 1			183			183
Segment 3C Phase 2				773		773
Total	**1,510**	**2,060**	**183**	**773**		**4,526**

The No-Action Alternative would also include a vegetation protection plan to protect vegetation during construction and a mitigation site protection plan, as described in Chapter 3.

Determination: The loss of SRA cover vegetation as a result of the No-Action Alternative would be a less-than-significant adverse effect because the loss would be fully mitigated.

5.4.2.3 Wetlands and Other Waters of the United States

There are no wetlands present in Segment 3C. No wetlands were identified in Segments 1 and 2 during preconstruction surveys (U.S. Army Corps of Engineers, 1985). A total of 5.56 acres of other waters of the United States occurs in Segments 1, 2, and 3C. Completed construction in Segments 1 and 2 resulted in a temporary effect on an estimated 4.16 acres of other waters (Table 5.4-1). Construction in Segment 3C Phase 2 will cover 1.40 acres of other waters with CCM armor (Table 5.4-1). Although the riverbed will be armored with CCM armor, the effect is considered temporary because the river will still flow unimpeded through this segment once construction is completed.

Determination: The No-Action Alternative would have no adverse effect on wetlands.

5.4.2.4 Upland Vegetation

There is no upland vegetation in Segment 3C.

Determination: The No-Action Alternative would have no adverse effect on upland vegetation.

5.4.2.5 Special-Status Plants

No plants that are State or federally listed or are proposed for State or Federal listing as threatened or endangered were observed or are considered likely to be found in the study area.

Determination: The No-Action Alternative would have no adverse effect on special-status plants.

5.4.3 Bypass System Alternative

The Bypass System Alternative includes the construction of a bypass in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, and additional offsite mitigation. The Guadalupe River Project with Bypass System Alternative is the construction of the Bypass System Alternative and operation of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass reach.

Unlike the incremental effects on hydrologic conditions, water quality, and many other resources discussed in Chapter 5, the incremental effect of the Bypass System Alternative on existing vegetation can be quantified in isolation from effects caused by the previously constructed phases of the Guadalupe River Project. For this reason, Section 5.4.3 presents the effects of just the Bypass System Alternative on vegetation. However, effects on vegetation directly affect other resources, such as water temperature. As previously described, effects of the Bypass System Alternative on water temperature cannot be adequately assessed in isolation from effects contributed by the entire "Guadalupe River Project with Bypass System Alternative." Mitigation for water temperature effects includes the planting of vegetation to provide shade. The amount of mitigation vegetation required for the Bypass System Alternative cannot be adequately determined in isolation from the amount required for the entire "Guadalupe River Project with Bypass System Alternative." For this reason, the vegetation mitigation requirements presented for the Bypass System Alternative are identical to the vegetation mitigation requirements for the entire "Guadalupe River Project with Bypass System Alternative."

5.4.3.1 Riparian Vegetation

Construction of the proposed bypass in Segments 3A and 3B would result in the loss of 5.76 acres of riparian vegetation (Tables 5.4-4 and 5.4-5). This loss contributes to the total loss of 14.12 acres of riparian vegetation caused by the entire Guadalupe River Project with Bypass System Alternative.

In 1992, the Corps and USFWS performed a HEP analysis to determine the mitigation needed to compensate for the effects on 14.12 acres of riparian vegetation expected under the Authorized Project (U.S. Army Corps of Engineers, 1991). The HEP analysis concluded that 21.0 acres of riparian vegetation plantings were required to offset the expected effects of the Authorized Project. Approximately 4.0 acres of native riparian vegetation have been planted in the floodplain terrace on the west side of the river in Segment 1. In 1998, approximately 17.0 acres of native riparian vegetation were planted in the floodplain terrace on the west side of the river in Segment 2. To date, 21.0 acres of riparian vegetation have been planted in Segments 1 and 2 (Table 5.4-2). The direct loss of 5.76 acres of riparian vegetation has been fully compensated for by the planting of 21.0 acres of riparian vegetation (U.S. Army Corps of Engineers, 1992).

No existing riparian vegetation will be affected in Reach A because mitigation planting in Reach A will not affect existing riparian vegetation.

The Guadalupe Creek Restoration Project site is a highly suitable site for providing SRA mitigation for the Guadalupe River Project with Bypass System Alternative (Section 3.4.2.5). Any effect of the Guadalupe Creek Restoration Project on riparian vegetation is being addressed by SCVWD in an EIR/EIS that is currently being prepared (Section 1.6.9).

TABLE 5.4-4. Summary of Effects of Bypass System Alternative on Vegetation
The loss of riparian vegetation and SRA cover vegetation will be greatest in Segment 3B.

	Riparian Vegetation (ac)[a]		Wetlands (ac)		Other Waters (ac)		SRA Cover Vegetation (lf)	
Project Segment	**Preproject**	**Affected**	**Preproject**	**Affected**	**Preproject**	**Affected[c]**	**Preproject**	**Affected**
Segment 3A	4.52[b]	2.34[b]	0	0	2.44	1.16	3,062	1,431
Segment 3B	5.96[b]	3.42[b]	0	0	2.82	2.12	3,839	2,430
Total	**10.48**	**5.76**	**0**	**0**	**5.26**	**3.28**	**6,901**	**3,861**

[a] Preproject riparian canopy mapping assumed that native and nonnative trees and shrubs growing on or near the top of bank and connected to the riparian canopy were included in the original riparian habitat mapping performed for the 1992 Mitigation and Monitoring Plan. The 1992 plan identified approximately 32 acres of riparian vegetation, including along the Woz Way to Park Avenue bypass reach, which is no longer considered part of the project.

[b] Preproject conditions for Segments 3A and 3B were mapped on bluelines dated October 27, 1990. Postproject conditions where adverse effects occurred were mapped on the project blueline set. This acreage was subtracted from the preproject acreage to determine postproject acreage.

[c] Effects on other waters of the United States are considered temporary. Although the riverbed will be armored with CCM armor, the effect is considered temporary because the river will still flow unimpeded through the segments once construction is completed. Other waters of the United States in Segments 3A and 3B consist of open water channel.

TABLE 5.4-5. Riparian Habitat Affected by the Bypass System Alternative (acres) and Riparian Vegetation Planted as Mitigation
The amount, location, and timing of effects on riparian habitat and riparian mitigation are compared. Segment 3B experienced the greatest loss of riparian vegetation. Riparian mitigation requirements for the Bypass System Alternative are the same as requirements for the entire Guadalupe River Project with Bypass System Alternative.

	Riparian Effects by Construction Start Date (ac)						
Project Segment	**1992**	**1994**	**1998**	**1999**	**2001**	**2002**	**Total Effects**
Segment 3A						2.34	2.34
Segment 3B						3.42	3.42
Total						**5.76**	**5.76**

	Riparian Mitigation by Planting Start Date (ac)					
Mitigation Areas	**1992**	**1994**	**1998**	**1999**	**2000**	**Total Mitigation**
Segment 1		1.7		2.3		4.0
Segment 2			17.0			17.0
Segment 3						0
Reach A Mitigation Site						0
Guadalupe Creek Mitigation Site						0
Total		**1.7**	**17.0**	**2.3**		**21.0**

Cumulative impacts on riparian vegetation, including effects of the Guadalupe Creek Restoration Project, are discussed in the cumulative impact analysis in Chapter 6.

The direct loss of 5.76 acres of riparian vegetation from construction of the Bypass System Alternative as well as the total loss of 14.12 acres from the Guadalupe River Project with Bypass System Alternative has been fully compensated for by the planting of 21.0 acres of riparian vegetation (U.S. Army Corps of Engineers, 1992) (Table 5.4-5).

5.4.3.2 Shaded Riverine Aquatic Cover Vegetation

Construction of the bypass in Segments 3A and 3B would result in the loss of 3,861 lf of SRA cover vegetation (Table 5.4-4). This loss contributes to the total loss of 8,387 lf of SRA cover vegetation attributable to the Guadalupe River Project with Bypass System Alternative. Mitigation planting in Reach A will not affect existing SRA cover vegetation.

No existing SRA cover vegetation will be affected in the Reach A mitigation site because proposed mitigation plantings will not affect existing SRA cover (Appendix 3 for more information on the Reach A mitigation site).

No flood protection features associated with the Bypass System Alternative will be constructed on Guadalupe Creek. Any effect of the Guadalupe Creek Restoration Project on SRA cover vegetation is being addressed by SCVWD in an EIR/EIS that is currently being prepared (Section 1.6.9). Cumulative impacts on SRA cover vegetation, including effects of the Guadalupe Creek Restoration Project, are discussed in the cumulative impact analysis in Chapter 6.

TABLE 5.4-6. Effects of Bypass System Alternative on SRA Cover Vegetation and SRA Cover Vegetation Planted as Mitigation (lf)

The amount, location, and timing of effects on SRA cover vegetation habitat and SRA cover mitigation are compared. Segment 3B experienced the greatest loss of SRA cover vegetation.

	SRA Cover Vegetation Effects by Construction Start Date					
Project Segment	**1992**	**1994**	**1999**	**2000**	**2002**	**Total Effects**
Segment 3A					1,431	1,431
Segment 3B					2,430	2,430
Total					**3,861**	**3,861**

	SRA Cover Vegetation Mitigation by Planting Start Date							
Mitigation Area	**1992**	**1994**	**1998**	**1999**	**2000**	**2001**	**2002**	**Total Mitigation**
Segment 1					119	456		575
Segment 2					163	918		1,081
Segment 3C								
Segment 3A							878	878
Segment 3B								
Woz Way to Park Ave. Bypass Reach			200[a]		210[c]			410
Reach A			1,543		6,108	197		7,848
Guadalupe Creek			1,263[b]			10,781[d,e]		12,044
Total			**3,006**		**6,600**	**12,352**	**878**	**22,836[f]**

a Children's Discovery Museum site (length based on as-built conditions).

b Includes 17 lf of Guadalupe Creek Phase 1 SRA cover vegetation mitigation for effects of installing a fish ladder at Masson Dam by SCVWD.

c Rubble removal site (100 lf) and Auzerais Point boulder site (110 lf).

d This work is scheduled to be completed in 2001 by SCVWD and is expected to be completed before construction of Segment 3C Phase 2 is completed in 2002.

e Estimated length available on Guadalupe Creek that would support SRA cover vegetation mitigation plantings.

f Total SRA mitigation for the Guadalupe River Project with Proposed Action Bypass System Alternative is based on the HEP analysis and equals 18,026 lf. Guadalupe Creek, between Masson Dam and Almaden Expressway, would be planted with SRA cover vegetation. A total of 7,234 lf of SRA cover vegetation mitigation on Guadalupe Creek would be used as mitigation for the Guadalupe River Project with Bypass System Alternative. These Phase 2 plantings on Guadalupe Creek would need to provide an estimated 5,971 lf of SRA cover vegetation mitigation to be applied to the Guadalupe River Project with Bypass System Alternative. Excess SRA cover vegetation mitigation credits on Guadalupe Creek would be used by SCVWD to mitigate for other projects. Based on the estimate of a total of 12,044 lf of SRA cover vegetation on Guadalupe Creek, approximately 4,810 lf would be available to be used by SCVWD to mitigate for other projects.

A multi-agency HEP analysis was performed to determine mitigation for losses of SRA cover vegetation for the Guadalupe River Project with Bypass System Alternative (U.S. Army Corps of Engineers, 1999, 2000c, and Appendix 3). A total of 22,836 lf of SRA cover vegetation mitigation will be planted in Segments 1, 2, and 3A, and the Reach A and Guadalupe Creek mitigation sites (Table 5.4-6).

SRA cover vegetation will be planted on unvegetated banks and within gaps in the existing riparian canopy. The purpose of these plantings is to maximize SRA cover vegetation in the downtown reach, the Reach A mitigation site, and the Guadalupe Creek mitigation site. In 1998, approximately 200 lf of riparian vegetation was planted in the Woz Way to Park Avenue bypass reach. In 2000, an additional 210 lf of riparian vegetation will be planted in the Woz Way to Park Avenue bypass reach. Also in 2000, approximately 282 lf of riparian vegetation will be planted in Segments 1 and 2. In 2001, approximately 1,376 lf of riparian vegetation will be planted in Segments 1 and 2. In 2002, approximately 878 lf of riparian vegetation will be planted in Segment 3A.

In 1998, approximately 1,543 lf of riparian vegetation was planted in Reach A. In 2000 and 2001, an additional 6,108 and 197 lf, respectively, of riparian vegetation will be planted (Table 5.4-6). In 1998, approximately 1,263 lf of riparian vegetation was planted in the Guadalupe Creek mitigation site. In 2001, an additional 10,781 lf of riparian vegetation will be planted (Table 5.4-6).

Guadalupe Creek between Masson Dam and Almaden Expressway would need to be restored for any mitigation credits to be applied from the Guadalupe Creek Restoration Project. Guadalupe Creek, between Masson Dam and Almaden Expressway, would be planted with an estimated 12,044 lf of SRA cover vegetation. A total of 7,234 lf of SRA cover vegetation mitigation on Guadalupe Creek would serve as mitigation for the Guadalupe River Project with Bypass System Alternative. The Phase 2 plantings on Guadalupe Creek would provide an estimated 5,971 lf of SRA cover vegetation mitigation to be applied to the Guadalupe River Project with Bypass System Alternative. Excess SRA cover vegetation mitigation credits on Guadalupe Creek would be used by SCVWD to mitigate for other projects. NMFS considers the SRA cover mitigation proposed for the Guadalupe Creek mitigation site to be an adequate amount of mitigation and requires this mitigation as a term and condition of its BO.

Determination: The direct loss of 3,861 lf of SRA cover vegetation from construction of the Bypass System Alternative as well as the total cumulative loss of 8,387 lf of SRA cover vegetation from the Guadalupe River Project with Bypass System Alternative is considered a less-than-significant adverse effect because the quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program and vegetation protection plan (Appendix 3).

To ensure that the SRA cover vegetation mitigation plantings are successful, the Corps and SCVWD will implement the SRA cover vegetation mitigation program detailed in the MMP (Appendix 3). SRA cover vegetation compensatory mitigation will include monitoring the SRA cover vegetation mitigation plantings installed in Segments 1, 2, and 3; the Reach A mitigation site; and the Guadalupe Creek mitigation site. Survival, health and vigor, natural recruitment, shaded stream surface, relative cover by noxious nonnative and introduced species, bank stability, instream cover, and channel bed stability will be monitored as detailed in the MMP (Appendix 3). The Bypass System Alternative includes a vegetation protection plan to protect SRA cover vegetation outside the construction area during construction and a mitigation site protection plan (Section 3.4.3.1).

Determination: The adverse effect on SRA cover vegetation as a result of the Bypass System Alternative is less than significant because SRA cover vegetation mitigation would be planted.

5.4.3.3 Wetlands and Other Waters of the United States

No jurisdictional wetland habitat and 5.26 acres of other waters of the United States are present in Segments 3A and 3B (Table 5.4-4; Section 4.4.3.1).

A total of 3.28 acres of other waters in Segments 3A and 3B will be temporarily affected by implementation of the Bypass System Alternative. These temporary effects will occur as a result of armoring the channel bed and bridge removal. Although the channel bed will be armored with CCM armor, the effect is considered temporary because the river will still flow unimpeded through the segments once construction is completed.

Effects on other waters of the United States in Segments 3A and 3B are not considered significant because the summer base-flow conditions and the ordinary high water level will be restored following construction and installation of armoring in the channel bed of Segment 3B. Where an armored channel will be constructed, the function of other waters of the United States will be replaced by the low-flow channel that will capture base flows (Section 3.4.2.3). The ordinary high water level, which is considered the 2-year storm event, will exceed the capacity of the low-flow channel and will include the remainder of the armored channel bed beyond the low-flow channel. The open water function of the armored low-flow channel in Segments 3A and 3B will be enhanced through the construction of check structures in the armored low-flow channel.

A total of 1.97 acres of jurisdictional wetlands and 6.45 acres of other waters of the United States are present in Reach A between I-880 and Airport Parkway (Section 4.4.3.2). The Guadalupe River Project with Bypass System Alternative would install 7,848 lf of SRA cover vegetation in Reach A. These mitigation plantings would not affect existing wetlands or other waters of the United States in Reach A (Appendix 3 for more information on the Reach A mitigation site).

Establishing additional native riparian vegetation in the Reach A mitigation site will enhance wetland functions and SRA habitat on the project site. The existing native understory dominants in the first terrace wetland would be understory dominants typically found in the woody riparian areas type (including marsh horsetail, creeping wild rye, and water smartweed). Existing filtration of sediment and nutrients is not likely to be affected. There will be no net wetland loss, but existing wetland functions and habitat values will be enhanced because a lower quality and more degraded emergent wetland type is being replaced by a higher quality forested and shrub wetland. It is also probable that the shade from riparian plantings may decrease noxious weeds, such as white top and fennel (*Foeniculum vulgare*).

No riverine wetlands will be directly affected by the planting of SRA cover vegetation in the Reach A mitigation site. As the riparian vegetation matures, it may provide too much shade, which could prevent the continued existence of some of the riverine wetlands. Many of the existing river wetlands are found in small discontinuous patches and the riparian vegetation will provide cover for wildlife.

The planting of SRA cover vegetation in the Reach A mitigation site will not have an effect on other waters of the United States. Although some of the creeping macrophytes in the river channel may be lost over time because of too much shade, the value of such instream cover to wildlife and fish is expected to be replaced by instream woody material contributed by the SRA cover vegetation.

No flood protection features associated with the Bypass System Alternative will be constructed on Guadalupe Creek. However, some of the existing wetlands and other waters of the United States may be affected by SCVWD's Guadalupe Creek Restoration Project. Effects of the Guadalupe Creek Restoration Project on wetlands and other waters of the United States are being addressed by SCVWD in an EIR/EIS that is currently being prepared (Section 1.6.9). Cumulative impacts on wetlands and other waters of the United States, including the effects of the Guadalupe Creek Restoration Project, are discussed in Chapter 6.

No mitigation is required for wetlands and other waters of the United States because no loss of wetlands will occur from the Guadalupe River Project with Bypass System Alternative and effects on other waters of the United States are considered temporary. Wetlands fish and wildlife habitat, streambank stabilization, water quality functions, and SRA habitat will be enhanced by the project.

Determination: The Bypass System Alternative would not affect wetlands because none are present in Segments 3A and 3B, and no flood protection features associated with the Bypass System Alternative will be constructed in Reach A mitigation site. The adverse effect on waters of the United States as a result of the Bypass System Alternative would be less than significant because the effect is considered temporary.

Operation and Maintenance Effects. As discussed in Section 5.2.3, the operation of the Guadalupe River Project with Bypass System Alternative will not result in a substantial change in sediment deposition anywhere in the project area or downstream from the project area. Small amounts of sediment will continue to accumulate in the project area after floodflows. SCVWD will continue to remove this accumulated sediment, as needed, from the project area using the routine channel maintenance activities described in Section 3.4.4. These routine channel maintenance activities include sediment removal and vegetation management activities, as well as woody debris removal and bank stabilization. This regular and periodic sediment-removal maintenance by SCVWD has the effect of precluding establishment of wetlands in Segments 3A, 3B, and other areas where they do not currently exist. No wetlands are impacted from on-going, routine channel maintenance in the project area.

As described in Section 1.6.15, these on-going, routine stream maintenance activities are part of SCVWD's Stream Maintenance Program. The Stream Maintenance Program Programmatic EIR will analyze potential wetland impacts from future routine maintenance activities, including those in the project area, and provide appropriate mitigation for any adverse environmental effects. In the future, routine sediment removal and bank stabilization activities will be conducted in the project area to preserve the as-built design of the Guadalupe River Project with Bypass System Alternative. These future maintenance requirements will be stipulated in the project's final Operation and Maintenance Manual,

and will be conducted in compliance with the Stream Maintenance Program Programmatic EIR.

Implementation of the Guadalupe River Project with Bypass System Alternative will require only the same routine channel maintenance activities that are presently being conducted in the project area.

Determination: On-going routine channel maintenance is not affecting wetlands in the downtown reach because none exist. Effects of future, routine channel maintenance activities in the project area will be addressed entirely in the Programmatic EIR for the Santa Clara Valley Water District Stream Maintenance Program. Future maintenance in the project area is not expected to impact wetlands, but if potential effects are identified in the Programmatic EIR for the Stream Maintenance Program, mitigation for those effects will be addressed in that Programmatic EIR.

Operation and Maintenance effects. As discussed in Section 5.2.3.1, "Channel Erosion and Deposition," the operation of the Guadalupe River Project with Bypass System Alternative would not result in a substantial change in sediment deposition in or downstream from the project area. Small amounts of sediment would continue to accumulate in the project area after floodflows. SCVWD will continue to remove this accumulated sediment from the project area as needed using the routine channel maintenance activities described in Section 3.4.4, "Operation and Maintenance." These routine channel maintenance activities include sediment removal and vegetation management, as well as woody debris removal and bank stabilization. This regular and periodic sediment-removal maintenance by SCVWD has the effect of precluding establishment of wetlands in Segments 3A, 3B, and other areas where they do not currently exist. No existing wetlands are impacted from current routine channel maintenance in the project area.

As described in Section 1.6.15, "Santa Clara Valley Water District Stream Maintenance Report," these routine stream maintenance activities are part of SCVWD's Stream Maintenance Program. The Stream Maintenance Program Programmatic EIR will analyze potential wetland impacts from future routine maintenance activities, including those in the project area, and provide for appropriate mitigation for any potential adverse environmental effects. In the future, routine sediment removal and bank stabilization activities would be conducted in the project area to preserve the as-built design of the Guadalupe River Project with Bypass System Alternative. These future maintenance requirements would be stipulated in the project's Final Operation and Maintenance Manual, and would be conducted in compliance with the Stream Maintenance Program Programmatic EIR.

Implementation of the Guadalupe River Project with Bypass System Alternative is not expected to require channel maintenance activities different from those currently conducted in the project area.

Determination: Current routine channel maintenance does not affect wetlands in the downtown reach because no wetlands exist in that area. The effects of future routine channel maintenance activities in the project area will be addressed in the Programmatic EIR for the Santa Clara Valley Water District Stream Maintenance Program. Future channel maintenance in the project area is not expected to impact wetlands, but if potential adverse

effects are identified in the Stream Maintenance Program Programmatic EIR , mitigation for those effects will be addressed in that Programmatic EIR.

5.4.3.4 Upland Vegetation

No upland vegetation has been identified in Segments 3A and 3B.

Upland vegetation in Reach A is classified as ruderal scrub and ruderal herbaceous habitats. Ruderal scrub habitat is primarily located on the upper slopes of the riverbank outside the proposed SRA mitigation planting areas in Reach A (Appendix 3). No flood protection construction activities will take place in the Reach A mitigation site. No ruderal scrub or ruderal herbaceous vegetation would be affected by the Bypass System Alternative.

No flood protection features associated with the Bypass System Alternative will be constructed on Guadalupe Creek. Any effect of the Guadalupe Creek Restoration Project on upland habitat is being addressed by SCVWD in an EIR/EIS that is currently being prepared (Section 1.6.9). Cumulative impacts on upland vegetation, including effects of the Guadalupe Creek Restoration Project, are discussed in Chapter 6.

Determination: The Bypass System Alternative would have no effect on upland vegetation because none is present in Segments 3A and 3B and no flood protection features associated with the Bypass System Alternative will be constructed in the Reach A mitigation site.

5.4.3.5 Special-Status Plants

No plants that are State or federally listed or that are proposed for State or Federal listing as threatened or endangered were observed or are considered likely to be found in the study area.

Determination: The Bypass System Alternative would have no effect on special-status plants because none are present in Segments 3A or 3B or the Reach A mitigation site.

5.4.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring on the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge (Section 3.5, "Comparison Summary of Project Features"). The Refined Bypass System Alternative would include the same environmental commitments as identified for the Bypass System Alternative (Section 3.4.3, "Environmental Commitments").

5.4.4.1 Riparian Vegetation

Construction of the Refined Bypass System Alternative would result in fewer effects on riparian vegetation than would occur under the Bypass System Alternative. As shown in Table 5.4-7, the Refined Bypass System Alternative would directly affect 5.41 acres of riparian vegetation, which is approximately 0.35 acre less than under the Bypass System Alternative. This loss contributes to a total loss of 13.77 acres of riparian vegetation that would be caused by the entire Guadalupe River Project with Refined Bypass System. To mitigate for the loss of riparian vegetation, 21.0 acres of riparian vegetation mitigation has been established in Segments 1 and 2 (Table 5.4-8). The direct loss of 5.41 acres of riparian vegetation from construction of the Refined Bypass System Alternative as well as the total

loss of 13.77 acres from the entire Guadalupe River Project with Refined Bypass System is considered less than significant because the planting of 21.0 acres of riparian vegetation fully compensates for these losses (U.S. Army Corps of Engineers, 1992).

Determination: The adverse effect on riparian vegetation as a result of the Refined Bypass System Alternative would be less than significant because of the previous planting of riparian vegetation and ongoing monitoring.

5.4.4.2 Shaded Riverine Aquatic Cover Vegetation

The Refined Bypass System Alternative would directly affect approximately 3,789 lf of SRA cover vegetation, which is approximately 72 lf less than would be affected under the Bypass System Alternative (Table 5.4-7). This loss contributes to the total loss of 8,315 lf of SRA cover vegetation that would be caused by the entire Guadalupe River Project with Refined Bypass System Alternative. A total of 22,836 lf of SRA cover vegetation mitigation will be planted in Segments 1, 2, and 3A, and the Reach A and Guadalupe Creek mitigation sites (Table 5.4-9).

The direct loss of 3,789 lf of SRA cover vegetation from construction of the Refined Bypass System Alternative as well as the total loss of 8,315 lf of SRA cover vegetation from the entire Guadalupe River Project with Refined Bypass System is considered less than significant because the quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program and vegetation protection plan.

Determination: The adverse effect on SRA cover vegetation as a result of the Refined Bypass System Alternative would be less than significant.

5.4.4.3 Wetlands and Other Waters of the United States, Upland Vegetation, and Special-Status Plants

No net loss of wetlands or other waters of the United States will occur as a result of the Refined Bypass System Alternative (Section 5.4.3.3, "Wetlands"). Similar to the Bypass System Alternative, no effects on ruderal scrub and ruderal herbaceous vegetation or special-status plant species would occur (Sections 5.4.3, "Upland Vegetation," and 5.4.3.5, "Special-Status Plants").

Determination: The adverse effect on other waters of the United States as a result of the Refined Bypass System Alternative would be less than significant. The Refined Bypass System Alternative would not affect wetlands because none are present.

Determination: The Refined Bypass System Alternative would have no adverse effect on upland vegetation or special-status plant species because none are present.

TABLE 5.4-7. Refined Bypass System Alternative Effects on Vegetation
The loss of riparian vegetation and SRA cover vegetation will be greatest in Segment 3B.

	Riparian Vegetation (ac)[a]		Wetlands (ac)		Other Waters of the United States (ac)		SRA Cover Vegetation (lf)	
Segment	**Preproject**	**Affected**	**Preproject**	**Affected**	**Preproject**	**Affected**	**Preproject**	**Affected**
Segment 3A	4.52[b]	2.06[b]	0	0	2.44	1.16	3,062	1,381
Segment 3B	5.96[b]	3.35[b]	0	0	2.82	2.12	3,839	2,408
Total	**10.48**	**5.41**	**0**	**0**	**5.93**	**3.28**	**6,901**	**3,789**

[a] Preproject riparian canopy mapping assumed that native and nonnative trees and shrubs growing on or near the top of bank and connected to the riparian canopy were included in the original riparian habitat mapping performed for the 1992 Mitigation and Monitoring Plan. The 1992 plan identified approximately 32 acres of riparian vegetation, including the Woz Way to Park Avenue bypass reach, which is no longer considered part of the project.

[b] Preproject conditions for Segments 3A and 3B were mapped on bluelines dated October 27, 1990. Postproject conditions where adverse effects occurred were mapped on the project blueline set. This acreage was subtracted from the preproject acreage to determine postproject acreage.

TABLE 5.4-8. Riparian Habitat Affected by the Refined Bypass System Alternative and Riparian Vegetation Planted as Mitigation (acres)
The amount, location, and timing of effects on riparian habitat and riparian mitigation are compared. Segment 3B experienced the greatest loss of riparian vegetation. Riparian mitigation requirements for the Refined Bypass System are the same as requirements for the entire Guadalupe River Project with Bypass System Alternative.

	Riparian Effects by Construction Start Date (ac)						
Project Segment	**1992**	**1994**	**1998**	**1999**	**2001**	**2002**	**Total Effects**
Segment 3A						2.06	2.06
Segment 3B						3.35	3.35
Total						**5.41**	**5.41**

	Riparian Mitigation by Planting Start Date (ac)					
Mitigation Area	**1992**	**1994**	**1998**	**1999**	**2000**	**Total Mitigation**
Segment 1		1.7		2.3		4.0
Segment 2			17.0			17.0
Segment 3C						0
Reach A Mitigation Site						0
Guadalupe Creek Mitigation Site						0
Total		**1.7**	**17.0**	**2.3**		**21.0**

TABLE 5.4-9. Refined Bypass System Alternative Effects on SRA Cover Vegetation and SRA Cover Vegetation Planted as Mitigation (lf)

The amount, location, and timing of effects on riparian habitat and riparian mitigation are compared. Segment 3B experienced the greatest loss of riparian vegetation. Riparian mitigation requirements for the Refined Bypass System are the same as requirements for the entire Guadalupe River Project with Bypass System Alternative.

	SRA Cover Vegetation Effects by Construction Start Date					
Project Segment	**1992**	**1994**	**1999**	**2001**	**2002**	**Total Effects**
Segment 3A					1,381	1,381
Segment 3B					2,408	2,408
Total					**3,789**	**3,789**

	SRA Cover Vegetation Mitigation by Planting Start Date							
Mitigation Area	**1992**	**1994**	**1998**	**1999**	**2000**	**2001**	**2002**	**Mitigation**
Segment 1					119	456		575
Segment 2					163	918		1,081
Segment 3C								
Segment 3A							878	878
Segment 3B								
Woz Way to Park Ave. Bypass Reach			200[a]		210[c]			410
Reach A			1,543		6,108	197		7,848
Guadalupe Creek			1,263 [b]			10,781 [d,e]		12,044
Total			**3,006**		**6,600**	**12,352**	**878**	**22,836** [f]

[a] Children's Discovery Museum site (length based on as-built conditions).

[b] Includes 17 lf of Guadalupe Creek Phase 1 SRA cover vegetation mitigation for effects of installing a fish ladder at Masson Dam by SCVWD.

[c] Rubble removal site (100 lf) and Auzerais Point boulder site (110 lf).

[d] This work is scheduled to be completed in 2001 by SCVWD but is expected to be completed prior to the completion of construction of Segment 3C Phase 2 early 2002.

[e] Estimated length available on Guadalupe Creek that would support SRA cover vegetation mitigation plantings.

[f] Total SRA mitigation for the Guadalupe River Project with Refined Bypass System Alternative is based on the HEP analysis and equals 18,026 lf. Guadalupe Creek, between Masson Dam and Almaden Expressway, would be planted with SRA cover vegetation. A total of 7,234 lf of SRA cover vegetation mitigation on Guadalupe Creek would be used as mitigation for the Guadalupe River Project with Bypass System Alternative. The Phase 2 plantings on Guadalupe Creek would need to provide an estimated 5,971 lf of SRA cover vegetation mitigation to be applied to the Guadalupe River Project with Bypass System Alternative. Excess SRA cover vegetation mitigation credits on Guadalupe Creek would be used by SCVWD to mitigate for other projects. Based on the estimate of a total of 12,044 lf of SRA cover vegetation on Guadalupe Creek, approximately 4,810 lf would be available to be used by SCVWD to mitigate for other projects.

5.5 Biological Resources – Wildlife

The analysis of effects on wildlife includes an assessment of riparian and wetland wildlife species and special-status wildlife species. The results of this analysis are presented below.

5.5.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of effects on wildlife. These criteria are based on the CEQA Guidelines and CEQ's NEPA regulations. Construction and operation activities would result in a significant effect on wildlife if the following were to occur:

- Substantial loss of wildlife habitat, disruption of natural movement corridors for wildlife, or fragmentation or isolation of riparian habitats
- Substantial disturbance or displacement of wildlife from recreational and other human activities
- Direct mortality to, or lowered reproductive success of, State or federally listed wildlife species or loss of habitat of these species
- Direct mortality to, or lowered reproductive success of, substantial portions of local populations of species that are candidates for State or Federal listing or that are California species of special concern or loss of habitat for these species
- Long-term or permanent disturbance or displacement from recreational and other human activities of substantial portions of local populations of species that are candidates for State or Federal listing or are California species of special concern

Beneficial effects include changes that would result in net increases in the extent or quality of native riparian, wetland, or upland wildlife habitats. Substantial beneficial effects are identified as significant effects.

5.5.2 No-Action Alternative

5.5.2.1 Riparian and Wetland Species

The No-Action Alternative includes the temporary loss of 8.36 acres of riparian wildlife habitat and 4,526 lf of SRA cover vegetation (Table 5.4-1). The riparian vegetation mitigation plan discussed in Section 5.4, "Biological Resources – Vegetation," will compensate for these effects by creating habitat acreage and habitat values equal to those lost (Tables 5.4-2 and 5.4-3). If the No-Action Alternative is selected, a new HEP analysis for SRA cover vegetation will be conducted to verify the incremental effects of the No-Action Alternative on riparian wildlife species. The new HEP analysis will determine whether additional SRA cover and riparian vegetation beyond that already planted in Segments 1 and 2 will be needed to mitigate effects on riparian wildlife species.

Determination: The No-Action Alternative would have no significant effects on riparian and wetland wildlife species because the riparian vegetation mitigation plan will compensate for all lost riparian wildlife habitat and SRA cover vegetation.

5.5.2.2 Special-Status Wildlife Species

No State or federally listed wildlife species are found in the study area. No effect on special-status wildlife species has occurred or is expected to occur with implementation of the No-Action Alternative.

Determination: The No-Action Alternative would have no adverse effect on special-status wildlife species because no special-status wildlife species occur in the study area.

5.5.3 Bypass System Alternative

The Bypass System Alternative is the construction of a bypass in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, and additional offsite mitigation. The Guadalupe River Project with Bypass System Alternative is the operation of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass reach.

The incremental effects on riparian and wetland wildlife species and special-status wildlife species have been evaluated for the Guadalupe River Project with Bypass System Alternative because the effect of the loss of riparian vegetation and SRA cover cannot be adequately evaluated for the Bypass System Alternative alone (Section 5.4, "Biological Resources – Vegetation"). Direct effects on wildlife as a result of construction of the Bypass System Alternative and maintenance activities and recreation associated with the Guadalupe River Project with Bypass System Alternative are also evaluated.

5.5.3.1 Riparian Wildlife Species

Construction of the Bypass System Alternative would result in the temporary loss of 5.76 acres of riparian wildlife habitat and 3,861 lf of SRA cover vegetation habitat (Table 5.4-1). The Guadalupe River Project with Bypass System Alternative would affect 14.12 acres of riparian wildlife habitat and 8,387 lf of SRA cover vegetation habitat. In addition to the direct construction effects on the existing SRA cover, the 5,532 lf of bank armoring and 2,635 lf of channel bed armoring proposed for Segments 3A and 3B would permanently cover natural substrate that has the potential to support overhead or instream SRA cover, respectively.

Removal of riparian vegetation and loss of SRA cover vegetation would result in the temporary and permanent loss of foraging, breeding, and roosting habitat in Segments 3A and 3B. Bank and channel armoring could affect habitat of numerous species, including aquatic and terrestrial invertebrates, amphibians, reptiles, small mammals, and insectivorous birds. The loss of habitat values would be compensated for by the riparian vegetation and SRA cover mitigation.

The proposed mitigation planting program and protection plans (Section 5.4, "Biological Resources – Vegetation") will replace wildlife habitat quantity and value that are affected by implementation of the Guadalupe River Project with Bypass System Alternative. A multiagency HEP analysis was conducted to assess the potential effects of the Bypass System Alternative on species that use SRA cover and riparian vegetation (U.S. Army Corps of Engineers, 2000b). The HEP analysis quantified the effects on wildlife that use SRA cover vegetation. The HEP analysis also demonstrated that the 18,026 lf of SRA cover vegetation planted as mitigation for the Guadalupe River Project with Bypass System Alternative fully mitigates the effects on SRA cover habitat. In addition, the fragmentation of the existing

riparian corridor that would occur as a result of construction of Segments 3A and 3B would be offset by infill plantings in Segments 1, 2, and 3B.

Operation of heavy equipment necessary to construct riverbed and bank armoring and the bypass could affect wildlife species that are unable to relocate, such as small rodents, amphibians, and reptiles. These construction activities could result in the mortality of individuals of a few common wildlife species.

Aquatic species could also be affected as a result of dewatering of the river channel to allow construction of the channel bed armoring in Segments 3A and 3B. As indicated in the Construction – Area Fish Management Plan (Section 3.4.3.1, "Measures to Avoid and Minimize Adverse Project Effects during Construction"), all native aquatic invertebrates and larger invertebrates would be removed by a qualified biologist. In addition, suitable habitat would remain available during the construction phase, both upstream and downstream from Segments 3A and 3B.

Occasional maintenance activities could also affect aquatic species as a result of removal of sediment or debris. These activities are not expected to adversely affect aquatic species because suitable habitat would be available upstream and downstream from the activity and because maintenance would be of short duration. Increasing the extent of the recreational trail system and the associated increase in human access to the riparian corridor could adversely affect wildlife by disturbing foraging, breeding, and roosting activities. Use of the recreational trail system is not expected to substantially affect wildlife habitat because trails are mostly located just outside of existing riparian areas or would pass through areas that are armored (Figure 3.4-9). The trail system would generally be located away from SRA cover mitigation sites but may pass within 15 feet of some sites. By locating the trail system outside of existing riparian areas, with the exception of trails on the armored areas, no additional fragmentation of riparian wildlife habitat would occur. Recreational use of the trail system, including walking, running, and exercising pets, could increase the potential for disturbance to wildlife because the trails pass near mitigation areas and undisturbed riparian habitat. However, most users would remain on the trail system and recreational activities expected to occur on the trail system are intermittent. Disturbance to wildlife would be further avoided through applicable City of San Jose leash laws.

Determination: The Bypass System Alternative would result in a less-than-significant adverse effect on riparian wildlife species because:

- Loss of habitat values would be compensated for by the riparian vegetation and SRA cover mitigation
- Aquatic species would be moved, and habitat is available upstream and downstream from construction and maintenance sites
- Recreation trails would be located away from riparian areas, and use of the trails would be intermittent

5.5.3.2 Wetland Wildlife Species

Construction of the Bypass System Alternative would have no effect on wetlands because none are present in Segments 1, 2, or 3. As indicated in Section 5.4, "Biological Resources –

Vegetation," wetlands in the Reach A mitigation site would not be adversely affected by planting riparian mitigation and may be enhanced.

Determination: The Bypass System Alternative would have no adverse effect on wetland wildlife species because no wetlands would be disturbed.

5.5.3.3 Special-Status Wildlife Species

No State or federally listed wildlife species are known to presently occur in Segments 1, 2, and 3, in Reach A, or in Guadalupe Creek. Suitable habitat for the California red-legged frog, burrowing owl, and southwestern pond turtle is present in the study area.

California Red-Legged Frog. Construction of the Bypass System Alternative in Segments 3A and 3B is not expected to adversely affect the red-legged frog because survey results indicate that frogs are not present in the project area (Section 4.5.2.1, "California Red-Legged Frog"). In addition, the suitability of habitat in the project area to support red-legged frogs is low. Maintenance activities, such as sediment removal from the river channel or disturbance of the riverbank, are not expected to adversely affect the red-legged frog because (1) the suitability of habitat is not expected to be substantially affected and (2) maintenance activities would be temporary. Cumulative effects on the red-legged frog are discussed in Section 6.2.6.2, "California Red-Legged Frog."

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on California red-legged frog because:

- No red-legged frogs occur in the study area
- The suitability of habitat for red-legged frog is low
- Potential red-legged frog habitat would not be substantially affected.

Burrowing Owl. Vacant lots and areas supporting ruderal vegetation that could provide habitat for burrowing owls are present in the project area (Section 4.5.2.2, "Burrowing Owl"). These areas would not be disturbed during construction of project features. In addition, as indicated in Section 5.4.3.4, no impacts on upland vegetation would occur under the Bypass System Alternative. It is unlikely that construction of the Bypass System Alternative or planting riparian vegetation in Reach A would affect burrowing owls because areas that would be disturbed provide habitat of only marginal quality, and no burrowing owls have been observed at or in the vicinity of the Bypass System Alternative in recent years. Maintenance activities would not affect burrowing owls because these activities would occur in or immediately adjacent to the river channel and away from burrowing owl habitat.

Determination: The Bypass System Alternative would have a less-than-significant effect on the burrowing owl because no burrowing owls occur in the study area and the suitability of habitat for the burrowing owl is marginal.

Southwestern Pond Turtle. Vacant fields adjacent to the Bypass System Alternative provide potential low-quality nesting sites for the southwestern pond turtle (Section 4.5.2.3, "Southwestern Pond Turtle"). Little upland habitat would be disturbed by construction of

the Bypass System Alternative. Turtles are not known to occur in the study area, and, if they are present, construction activities would only temporarily disturb habitat for the turtle.

Determination: The Bypass System Alternative would have a less-than-significant effect on the southwestern pond turtle because southwestern pond turtles are not known to occur in the study area and, if present, construction activities would only temporarily disturb them.

5.5.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would reduce effects on riparian vegetation and SRA cover vegetation by 0.35 acre and 72 lf, respectively. The east bank recreational trail would not be routed under New Julian Street Bridge.

5.5.4.1 Riparian and Wetland Wildlife Species

Effects on riparian wildlife species would be slightly reduced under the Refined Bypass System Alternative compared to the Bypass System Alternative because slightly less SRA cover and riparian habitat would be affected. Routing the trail system from under New Julian Street Bridge would reduce the amount of bank armoring and associated loss of riparian habitat when compared to the Bypass System Alternative. In addition, there would be slightly less recreation-related disturbance of wildlife habitat by not routing the recreation trail along the water in the area of New Julian Street Bridge. Trails located away from the riverbank have less effect on riparian wildlife.

Determination: The Refined Bypass System Alternative would have a less-than-significant effect on riparian and wetland wildlife species for the same reason indicated under the Bypass System Alternative.

5.5.4.2 Special-Status Wildlife Species

Effects on special-status wildlife species, including the California red-legged frog, burrowing owl, and southwestern pond turtle, would be the same as under the Bypass System Alternative.

Determination: The Refined Bypass System Alternative would have a less-than-significant effect on special-status species for the same reasons listed under the Bypass System Alternative.

5.6 Biological Resources – Fish

5.6.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of effects on fish and fish habitat. Criteria for determining the significance of effects on fish are based on the CEQA Guidelines. A significant effect on fish and fish habitat would occur if the project would:

- Substantially reduce fish habitat

- Cause fish populations to drop below self-sustaining levels
- Threaten to eliminate a fish community
- Reduce the numbers of a rare, threatened, or endangered species

Although the significance criteria are for mandatory findings under CEQA, actual determination of fish population and fish community response is not possible with the information available for the Guadalupe River. This assessment, therefore, assumes that substantial reduction in fish habitat would directly reduce fish population abundance and alter fish communities.

5.6.2 Fisheries Analysis

This assessment discusses the effects of the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative on fish habitat by life stage, including adult and juvenile anadromous fish migration, anadromous fish spawning and incubation, and resident and anadromous fish rearing. Anadromous species in the Guadalupe River include chinook salmon, steelhead, and Pacific lamprey. Anadromous fish in the Guadalupe River generally migrate between October and June, depending on the species and life stage (Section 4.6.2, "Special-Status Fish Species"). Spawning and incubation of anadromous fish in the Guadalupe River generally occur between October and May (Section 4.6.2, "Special-Status Fish Species").

Resident species include native species, such as Sacramento sucker, California roach, and hitch, and introduced species, such as largemouth bass, green sunfish, carp, and goldfish. All anadromous and resident species addressed in this analysis, except chinook salmon, occur year-round in the Guadalupe River (Sections 4.6.1, "Fish Known to Occur in the Guadalupe River," and 4.6.2, "Special-Status Fish Species"). Juvenile chinook salmon rear in the Guadalupe River from January to June, with most leaving the river by May.

This fisheries analysis evaluates the following key factors that could affect fish in the Guadalupe River:

- Hydrologic and hydraulic effects
- Channel erosion and deposition effects
- River morphology effects
- Suspended solids and toxic constituents effects
- Water temperature effects
- SRA cover effects

Appendix 1B, "Fish Impact Assessment Methods," describes the assessment methods used for this analysis. Appendix 1C, "Thermal Effects on Life Stages of Steelhead and Chinook Salmon," provides a detailed description of water temperature effects on steelhead and chinook salmon in the Guadalupe River.

5.6.3 No-Action Alternative

5.6.3.1 Adult and Juvenile Anadromous Fish Migration

Hydrologic and Hydraulic Effects. The change in flows in the Guadalupe River during periods water is entering the secondary channel would not adversely affect the migration of juvenile and adult species because water depth necessary for migration would be maintained in the natural channel. Water from the Guadalupe River enters the secondary channel near Coleman Avenue and returns to the river near I-880 (Section 3.2, "Completed Portions of the Authorized Project"). Water begins to flow into the secondary channel when the river flows reach approximately 300 cfs. When river flows reach 1,000 cfs, approximately 20 percent enters the secondary channel.

The secondary channel also could entrain juvenile and adult anadromous fish. Although unlikely, entrainment could lead to stranding and increased mortality. The No-Action Alternative includes a secondary channel designed to maintain a connection sufficient to enable fish to return to the natural river channel.

Determination: The No-Action Alternative would have no adverse hydrologic or hydraulic effects on adult or juvenile anadromous fish migration because the water depth necessary for migration would be maintained in the natural channel and the secondary channel is designed to prevent fish entrainment.

Channel Erosion and Deposition Effects. Increased erosion and deposition of channel bed soil could reduce riffle depth or increase flow velocity. These factors could create conditions that would inhibit upstream migration of anadromous species. Because channel maintenance flows will remain in the natural Guadalupe River channel (Section 3.2, "Completed Portions of the Authorized Project," and Appendix 1B), it is expected that velocity and depth conditions would have little or no effect on anadromous fish migration. Monitoring stream depth and flow velocity, along with observing adult fish occurrence, would verify that the adverse effects of channel bed erosion and deposition on fish migration remain less than significant (Appendix 3).

Determination: The No-Action Alternative would have no adverse channel erosion and deposition effects on juvenile or adult anadromous fish migration because channel maintenance flows would remain in the natural channel and monitoring would verify that adverse effects of channel bed erosion and deposition remain less than significant.

River Morphology Effects. Under the No-Action Alternative, Segment 3C of the river channel bed would be armored with concrete or CCM (Section 3.3.2, "Construction Features"). Channel armoring could create depth and velocity conditions that would impede passage of adult and juvenile anadromous fish. Adverse effects of armoring on fish passage would be avoided by constructing a trapezoid/boulder low-flow channel reach in the armored channel bed of Segment 3C (Figure 3.3-1). This low-flow channel would maintain a water depth of greater than 0.8 foot (9.6 inches) when the flow reaches 4 cfs or greater. This water depth exceeds the depth needed to facilitate migration of adult and juvenile anadromous species (Appendix 1B). Hence, changes in channel geomorphology from components installed under the No-Action Alternative would not adversely affect migration of anadromous fish. A low-flow channel has already been installed in armored bottom areas of Segments 1 and 2 (Section 3.2.1), providing passage conditions for anadromous fish.

Determination: The No-Action Alternative would have no adverse river morphology effects on juvenile or adult anadromous fish migration because the channel would be designed to maintain a water depth that exceeds the depth needed for migration.

Suspended Solids and Toxic Constituents Effects. The No-Action Alternative includes construction of Segment 3C Phase 2, which has received approval under previous environmental documentation (U.S. Army Corps of Engineers, 1991b, 1995). As described in Chapter 3, measures to avoid and minimize adverse project effects during construction would be implemented, including an SWPPP, an erosion and sediment control plan, and a toxic materials control and spill response plan (Section 3.3.3, "Environmental Commitments").

Determination: The No-Action Alternative would have no adverse suspended solids or toxic constituents effects on juvenile or adult anadromous fish migration because measures to minimize adverse project effects would be implemented.

Water Temperature Effects. A separate assessment of the water temperature effects of the No-Action Alternative has not been completed. For the Guadalupe River Project with Bypass System Alternative, water temperature effects on fish migration are considered less than significant because postproject and postmitigation water temperatures from the November through February migration period would be similar to existing conditions (Section 5.6.4.1, "Adult and Juvenile Anadromous Fish Migration," and Appendix 1C). The water temperature effect that would be specific to the No-Action Alternative would be less than the minimal increase modeled for the Guadalupe River Project with Bypass System Alternative (Section 5.3.2, "No-Action Alternative"). The effects are less primarily because less SRA cover vegetation would be disturbed (Section 5.4.2.2).

Determination: The No-Action Alternative would have a less-than-significant water temperature effect on juvenile or adult anadromous fish migration because water temperatures from November through February would remain similar to existing temperatures.

Shaded Riverine Aquatic Cover Effects. SRA cover vegetation has been or would be removed during channel and bank armoring (Section 5.4.2.2, "Shaded Riverine Aquatic Cover Vegetation"). SRA cover vegetation provides anadromous fish with resting areas and refuge from predators. SRA cover vegetation would be planted (Section 3.3.2.2, "Measures to Compensate for Adverse Project Effects") to reestablish resting areas and provide refuge from predators as the vegetation matures. In addition, the effects of the loss of instream SRA cover have been minimized by placing boulders in the low-flow trapezoid channel to provide cover and resting areas for fish in the armored bottom section of Segment 3C.

Determination: The No-Action Alternative would have a less-than-significant SRA cover effect on juvenile or adult anadromous fish migration because SRA cover would be planted and the trapezoid/boulder low-flow channel would provide habitat diversity.

5.6.3.2 Anadromous Fish Spawning and Incubation

Hydrologic and Hydraulic Effects. Most spawning of adult anadromous fish species in the Guadalupe River occurs when river flows are less than 1,000 cfs. Spawning would not be affected by the change in flow caused by the secondary channel because adequate water depth for spawning would always be maintained in the natural river channel. The secondary

channel in Segments 1 and 2 has been designed to allow most of the flow to remain in the natural river channel when flows are 1,000 cfs or less (Section 3.2, "Completed Portions of the Authorized Project").

Determination: The No-Action Alternative would have no adverse hydrologic or hydraulic effects on anadromous fish spawning and incubation because adequate water depth for spawning would be maintained.

Channel Erosion and Deposition Effects. Although channel bed erosion and deposition have the potential to occur near the secondary channel intake and discharge (Section 5.2.2, "No-Action Alternative"), a relatively small proportion of overall spawning habitat would be affected. In addition, channel maintenance flows would remain in the natural Guadalupe River channel (Section 5.1, "Hydrologic and Hydraulic Consequences," and Appendix 1B). These flows are expected to maintain spawning habitat. Monitoring gravel quantity and quality and observing spawning would verify whether spawning gravels are being maintained (Appendix 3).

Determination: The No-Action Alternative would have less-than-significant channel erosion and deposition effects on anadromous fish spawning and incubation because:

- Only a small proportion of spawning habitat would be affected
- Channel maintenance flows would remain in the natural channel
- Monitoring would verify that spawning gravels are maintained

TABLE 5.6-1. Direct Effects of Construction on Spawning Gravel under the No-Action Alternative

Project Segment	Preproject Gravel Abundance (sf)	Loss of Spawning Gravel (sf)
Segment 1	1,000	0
Segment 2	3,390	20
Segment 3C Phase 1	500	500
Segment 3C Phase 2	200	200
Segment 3C Phase 3	–	–
Segment 3A	10,600	0
Segment 3B	9,700	0
Reach A Mitigation Site	N/A[a]	0
Guadalupe Creek Mitigation Site	N/A[b]	–
Total	**25,390**	**720**

[a] Spawning gravel in Reach A would not be affected by the proposed mitigation and has not been surveyed.

[b] Any effects from Guadalupe Creek mitigation would be discussed in environmental documents for that project.

Note: Spawning gravel would not be affected during construction of Segment 3C Phase 3 because no in-channel work would occur.

River Morphology Effects. Grading, channel widening, and channel armoring have affected little of the approximately 4,390 sf of gravels in Segments 1 and 2 (Table 5.6-1). Construction of Segment 3C elements would result in removal of about 700 sf of gravel. Gravels potentially provide spawning and rearing habitat (Section 4.6.2, "Special-Status Fish Species"). Hence, the loss of gravels would adversely affect spawning habitat for chinook salmon, steelhead, and other fish species. Spawning gravels would be replaced consistent with the quality and quantity present under preproject conditions (Section 3.4.3, "Environmental Commitments").

Determination: The No-Action Alternative would have a less-than-significant river morphology effect on anadromous fish spawning and incubation because spawning gravels would be replaced.

Suspended Solids and Toxic Constituents Effects. The No-Action Alternative includes construction of Segment 3C Phase 2, which has received approval under previous environmental documentation (U.S. Army Corps of Engineers, 1991b). Also, as described in Chapter 3, measures to avoid and minimize adverse project effects during construction would be implemented, including an SWPPP, an erosion and sediment control plan, and a toxic materials control and spill response plan.

Determination: The No-Action Alternative would have no adverse suspended solids or toxic constituents effects on anadromous fish spawning and incubation because measures to minimize adverse project effects would be implemented.

Water Temperature Effects. A separate water temperature analysis of No-Action Alternative effects has not been completed. For the Guadalupe River Project with Bypass System Alternative, water temperatures during the primary fish spawning and incubation period from November through February would be similar to those under preproject conditions (Section 5.6.4.2, "Anadromous Fish Spawning and Incubation," and Appendix lC).

The water temperature increase that would be specific to the No-Action Alternative would be smaller than the increase modeled for the Guadalupe River Project with Bypass System Alternative (Section 5.3.2, "No-Action Alternative"). Effects are less primarily because less SRA cover vegetation would be disturbed (Section 5.4.2.2).

Determination: The No-Action Alternative would have a less-than-significant water temperature effect on anadromous fish spawning and incubation because water temperature increases would be similar to those under preproject conditions.

5.6.3.3 Resident and Anadromous Fish Rearing

Hydrologic and Hydraulic Effects. The operation of the secondary channel in Segments 1 and 2 would not affect rearing conditions because adequate depth and velocity would be maintained in the natural channel of the river. The secondary channel would provide rearing habitat when flows exceed 300 cfs (Section 3.2, "Completed Portions of the Authorized Project"). Flows greater than 1,000 cfs would provide increasingly more rearing habitat when riparian vegetation is flooded. This additional habitat would potentially benefit resident species and juvenile anadromous species by temporarily increasing habitat area, providing a temporary refuge from high flow velocity, and periodically supplying an additional input of food organisms.

Determination: The No-Action Alternative would have no adverse hydrologic or hydraulic effects on resident and anadromous fish rearing because adequate water depth and flow velocity would be maintained.

Channel Erosion and Deposition Effects. Channel bed erosion and deposition could reduce rearing habitat diversity by altering the occurrence of pool, riffle, run, and backwater areas. Channel bed erosion and deposition could occur near the secondary channel intake and discharge. A relatively small proportion of overall rearing habitat would be directly affected by the secondary channel. Ongoing bottom erosion and deposition could affect rearing habitat in the natural river channel throughout Segments 1 and 2 (Section 5.2.2). However, channel maintenance flows would remain in the natural river channel (Section 3.2, "Completed Portions of the Authorized Project," and Appendix 1B) and would be expected to maintain rearing habitat. Monitoring the diversity of rearing habitat, along with monitoring juvenile steelhead and chinook salmon occurrence, would verify that the adverse effects of channel bed erosion and deposition on rearing habitat remain less than significant (Appendix 3).

Determination: The No-Action Alternative would have less-than-significant channel erosion and deposition effects on resident and anadromous fish rearing because:

- Only a small proportion of rearing habitat would be affected
- Channel maintenance flows are expected to maintain rearing habitat
- Monitoring would verify that effects remain less than significant

River Morphology Effects. Armoring the stream channel in Segment 3C would result in the loss of existing pools, riffles, and runs (Section 3.2, "Completed Portions of the Authorized Project" and Section 4.2.3). However, this change in channel form and associated effects on rearing habitat would be minimized by installing a trapezoid/boulder low-flow channel. The low-flow channel encourages the formation of pools, riffles, and gravel bars that provide habitat diversity in the armored section. SRA cover vegetation would be planted onsite in the downtown reach, offsite in Reach A, and at the Guadalupe Creek mitigation site (Section 3.4.3, "Environmental Commitments"). The SRA cover vegetation, biotechnical features such as logs and rootwads, and the boulders in the constructed low-flow channel would replace instream and overhead cover and resting areas for fish and habitat for aquatic food organisms.

Determination: The No-Action Alternative would have less-than-significant adverse river morphology effects on resident and anadromous fish rearing because of construction of the trapezoid/boulder low-flow channel. Restoration of SRA cover vegetation and placement of logs and rootwads would reestablish the diversity of rearing habitat.

Suspended Solids and Toxic Constituents Effects. The No-Action Alternative includes construction of Segment 3C Phase 2, which has received approval under previous environmental documentation (U.S. Army Corps of Engineers, 1985, 1991b). Also, as described in Chapter 3, measures to avoid and minimize adverse project effects during construction would be implemented, including an SWPPP, an erosion and sediment control plan, and a toxic materials control and spill response plan (Section 3.3.3, "Environmental Commitments").

Determination: The No-Action Alternative would have no adverse suspended solids or toxic constituents effects on resident and anadromous fish rearing because measures to minimize adverse project effects during construction would be implemented.

Water Temperature Effects. A separate assessment of No-Action Alternative effects on water temperature has not been completed. Effects on survival of juvenile chinook salmon and steelhead that are related to increases in water temperature are considered less than significant for the Guadalupe River Project with Bypass System Alternative (Section 5.6.4.3, "Resident and Anadromous Fish Rearing," and Appendix 1C). The effect on water temperature specific to the No-Action Alternative would be smaller than the water temperature effect described for the Guadalupe River Project with Bypass System Alternative, primarily because less SRA cover vegetation would be disturbed (Section 5.3.2, "No-Action Alternative"). Monitoring water temperature, along with observing juvenile steelhead occurrence, would verify whether the adverse effects of increased water temperatures on juvenile steelhead survival remain less than significant (Appendix 3). Selection of the No-Action Alternative would require simulation of water temperatures to determine specific mitigation needs, which would be less than but similar to the SRA mitigation for the Guadalupe River Project with Bypass System Alternative.

Determination: The No-Action Alternative would have a less-than-significant adverse water temperature effect on resident and anadromous fish rearing because water temperature increases would be less than increases under the Bypass System Alternative and monitoring would verify that effects remained less than significant.

Shaded Riverine Aquatic Cover Effects. SRA cover has been or would be removed as a result of riverbed and bank armoring (Section 3.2, "Completed Portions of the Authorized Project"). The removal of SRA cover vegetation could adversely affect rearing habitat by exposing fish to predators, reducing the availability of resting areas, and reducing the abundance of aquatic food organisms. SRA cover vegetation would be planted onsite in the downtown reach, offsite in Reach A, and at the Guadalupe Creek mitigation site (Section 3.4.3, "Environmental Commitments"). The SRA cover vegetation, biotechnical features such as logs and rootwads, and the boulders placed in the constructed low-flow channel would replace instream and overhead cover and resting areas for fish and habitat for aquatic food organisms. SRA cover vegetation would be planted onsite in the downtown reach, offsite in Reach A, and at the Guadalupe Creek mitigation site. The mitigation plantings would provide overhead cover as the vegetation matures. These actions would minimize the effects of loss of SRA cover, reestablish instream and overhead cover, and increase the value of rearing and spawning habitat for anadromous fish.

Determination: The No-Action Alternative would have a less-than-significant adverse SRA cover effect on resident and anadromous fish rearing because restoration of SRA cover vegetation, construction of the trapezoid/boulder low-flow channel, and placement of logs and rootwads would reestablish the diversity of rearing habitat.

5.6.4 Bypass System Alternative

The Bypass System Alternative is the construction of a bypass in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, and

additional offsite mitigation. The Guadalupe River Project with Bypass System Alternative is the operation of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass reach.

The operation of the Bypass System Alternative cannot be isolated from the operation of the entire Guadalupe River Project with Bypass System Alternative. Therefore, the evaluation of the Bypass System Alternative's effect on fish and fish habitat associated with changes in river morphology, SRA cover, suspended solids, toxic constituents, hydraulic properties, channel erosion and deposition, and water temperature are based on the Guadalupe River Project with Bypass System Alternative and not the Bypass System Alternative alone. Similarly, mitigation for effects on fish and fish habitat was determined for the Guadalupe River Project with Bypass System Alternative and not the Bypass System Alternative alone.

5.6.4.1 Adult and Juvenile Anadromous Fish Migration

Hydrologic and Hydraulic Effects. There would be a reduction in maximum flows in the natural river channel of the downtown reach during periods when water is entering the bypasses (Section 5.1.3). The change would not adversely affect the migration of juvenile and adult fish because the water depth necessary for migration would be maintained. For flows greater than 1,500 cfs, the bypass system diversions would reduce flow in the natural river channel between Woz Way and Park Avenue and between St. John Street and Coleman Avenue, as compared to existing conditions (Section 5.1.3). Flows entering the bypass when the river reaches 1,500 cfs would not affect depths needed for migration of steelhead and chinook salmon in the natural river channel. Flows greater than 1,500 cfs would begin to flow into the bypass system.

Change in the mean water velocity in the natural channel (Section 5.1.3) was evaluated to determine if fish passage would be affected by the Bypass System Alternative. Table 5.6-2 shows that under a 2-year flow event, mean channel velocities would decrease with implementation of the Guadalupe River Project with Bypass System Alternative. For a 10-year and 100-year flow event, mean channel velocities between Park Avenue and New Julian Street would increase, but would decrease between New Julian Street and Coleman Avenue. The mean channel velocities for floods that equal or are smaller than a 10-year flood event would not exceed the maximum water velocity threshold of 8.0 fps for upstream migration (Thompson, 1972). Flows in the Guadalupe River have exceeded the levels of a 2-year flood event fewer than 1.5 percent of the total days from 1972 though 1991 during the November through April rainy season.

The Bypass System Alternative includes the construction of two or three box culverts from downstream from Santa Clara Street to the vicinity of Coleman Avenue. The three-box-culvert design includes box culverts approximately 2,000, 4,000, and 5,000 feet long. The Bypass System Alternative also includes the completion of the Woz Way to Park Avenue bypass. Neither bypass system would divert flows until flows in the river channel reach approximately 1,500 cfs. Adult and juvenile steelhead may become stranded in the bypass during receding flows. The likelihood of fish entrapment during receding flows would increase if pools formed in the channel beds of the bypass systems. The bypass would be designed to avoid the formation of pools. In addition, the bypass systems would operate only infrequently and for short durations, usually less than 3 days for a 100-year flood event. An analysis of daily peak flows determined that during the 6-month rainy season (November through April) from 1972 through 1991, Guadalupe River flows equaled or

TABLE 5.6-2. Mean Channel Velocity at Representative Cross Sections under Existing Conditions and with the Guadalupe River Project with Bypass System Alternative

Under the 2-year flood event, mean channel velocities would decrease. Under the 10-year and 100-year flood events, mean channel velocities between Park Avenue and New Julian Street would increase. Data presented are based on preliminary planning-level analysis.

	Discharge (Total Flow)		Mean Channel Velocity	
Flood Event Interval (years)	Existing Conditions (cfs)	Guadalupe River Project with Bypass System Alternative (cfs)	Existing Conditions (ft/sec)	Guadalupe River Project with Bypass System Alternative (ft/sec)
Park Avenue to San Fernando Street				
2-year	1,725	1,725	5.22	4.48
10-year	5,025	5,025	4.56	7.86
100-year	14,600	14,600	5.81	9.37
San Fernando Street to Santa Clara Street				
2-year	1,725	1,725	3.52	3.1
10-year	5,025	5,025	3.95	6.9
100-year	14,600	14,600	5.92	10.57
Santa Clara Street to New Julian Street				
2-year	2,300	2,075	4.36	4.06
10-year	6,700	4,000	5.31	5.45
100-year	17,000	7,000	4.93	6.41
New Julian Street to Coleman Avenue				
2-year	2,300	2,075	4.18	3.96
10-year	6,700	3,400	5.11	3.68
100-year	17,000	4,000	5.72	2.41
Coleman Avenue to I-880				
2-year	2,300	2,300	5.55	5.55
10-year	6,700	6,700	6.08	6.08
100-year	17,000	17,000	5.12	5.12

Source: Elliot, pers. comm.

Avenue, velocity in the bypass systems would exceed natural channel velocities if the flows are equal to or higher than the flows occurring during a 20-year flood event (Table 5.1-3). At20-year flood events of 9,300 cfs, the bypass flow velocities of 8.3 fps would exceed the natural channel velocity of 7.9 fps. However, according to Thompson (1972), the maximum water velocity that allows upstream migration of adult steelhead is 8.0 fps. When flow velocity in the bypass exceeds the velocity of the natural channel but remains at or below 8 fps, steelhead may be attracted to the bypass. Bates (1992) suggests that upstream migrants do not move during major flood events. The criteria of Thompson (1972) also indicate that upstream migrations would probably cease during 20-year or greater flood events. The tendency for anadromous fish to use the bypasses would be further reduced because of the dark environment. Steelhead select lighted entrances over dark entrances when

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Determination: The Bypass System Alternative would have less-than-significant adverse hydrologic or hydraulic effects on adult and juvenile anadromous fish migration because:

- The water depth necessary for migration would be maintained in the natural channel.
- The bypass would be designed to prevent fish entrainment.
- Migrating adult steelhead are not likely to enter the bypass system.
- The change in velocities will not affect fish passage.

Channel Erosion and Deposition Effects. The increased potential for channel erosion in Segments 1 and 2 (Section 5.2.3.1, "River Morphology, Bypass System Alternative – Channel Erosion and Deposition") could result in reduced channel depth or increased velocity but is not expected to create conditions that would inhibit upstream migration of anadromous species. Channel maintenance flows would remain in the natural Guadalupe River channel (Section 5.1, "Hydrologic and Hydraulic Consequences"; Appendix 1B) and would maintain channel form that would not inhibit anadromous fish migration.

Invert stabilization structures would be installed between St. John Street and Coleman Avenue to maintain the preproject bottom elevation. USFWS, NMFS, and CDFG would review and approve the final design of the invert stabilization structures prior to construction. The structures would create riffles and pools, ensuring that channel form results in conditions that would meet the depth and velocity needs of migratory anadromous species.

Monitoring channel bed stability, depth and velocity, and gravel quantity and observing adult fish occurrence would verify that the adverse effects of channel bed erosion and deposition on fish migration remain less than significant (Appendix 3).

Determination: The Bypass System Alternative would have less-than-significant adverse channel erosion and deposition effects on adult and juvenile anadromous fish migration because:

- Channel maintenance flows would remain in the natural channel.

- The channel form would result in velocity and depth conditions not expected to inhibit fish migration.
- Monitoring would verify that effects remained less than significant.

River Morphology Effects. The Bypass System Alternative includes armoring a portion of the channel bed with CCM (Section 3.4.2, "Construction Features"). During low flows, channel armoring may create depth and velocity conditions that could impede passage of adult and juvenile anadromous fish. Adverse effects on fish passage through armored reaches would be avoided by installing a low-flow channel (Figure 3.4.4). The check structures, boulders, and gravel in the low-flow channel would result in a water depth greater than 1 foot at 4 cfs, exceeding the depth needed to facilitate migration of adult anadromous fish (Section 3.4.2.3, "Low-Flow Channel with Check Structures," Section 4.6.3; Appendix 1B).

The Bypass System Alternative would remove or modify existing physical barriers to fish passage in Segments 1, 2, and 3. The Bypass System Alternative would remove the USGS weir located near the St. John Street Bridge and relocate the gage. An invert stabilization structure would replace the weir. Also, exposed gas and sewer lines that cross the Guadalupe River near the Old Julian Street Bridge would be relocated. The relocation and modification of barriers would improve conditions for migration of adult and juvenile anadromous fish. In addition, recently completed and proposed modifications of downstream and upstream barriers, including installation of the fish ladder on the Alamitos drop structure below Almaden Lake, provide access to a minimum of 10.9 miles of additional spawning and rearing habitat for steelhead and chinook salmon in the tributary streams in the upper Guadalupe River watershed. The high degree of stream shading and the existing flow releases from the upstream reservoirs in summer maintain summer water temperatures below 70 °F in most tributary reaches. USFWS has indicated that the tributary streams could support a self-sustaining population of anadromous fish (White, pers. comm.).

In-channel construction may require placing temporary coffer dams and flow bypasses around construction sites. A construction area fish management plan would be implemented and in-channel construction would be limited to May 1 through October 15 (Section 3.4.3, "Environmental Commitments"). Temporary dams would not delay migration of adult and juvenile anadromous species.

Determination: The Bypass System Alternative would have both beneficial river morphology effects and less-than-significant short-term adverse river morphology effects on adult and juvenile anadromous fish migration because:

- Relocation and modification of barriers would improve conditions.
- Recently completed modifications to barriers provide access to additional spawning and rearing habitat.
- Construction-area management would avoid and minimize possible migration delays caused by coffer dams and flow bypasses around construction sites.

Suspended Solids and Toxic Constituents Effects. Although unlikely, materials used in construction or in the maintenance of construction equipment, such as concrete, sealants,

and oil, could be spilled accidentally (Section 5.3, "Water Quality"). A toxic materials control and spill response plan would be implemented to avoid adverse effects on migrating fish (Section 3.4.3, "Environmental Commitments").

Determination: The Bypass System Alternative would have no adverse suspended solids or toxic constituents effects on adult and juvenile anadromous fish migration because measures to minimize adverse project effects would be implemented.

Water Temperature Effects. Migration of anadromous fish peaks during late fall, winter, and early spring (Section 4.6.2) when the Bypass System Alternative would have little effect on water temperature. Postproject and postmitigation water temperatures from November through February would be similar to those existing under current conditions (Section 5.3.3). Water temperatures during the anadromous fish migration period would be within the range that would support migration of adult and juvenile chinook salmon and steelhead (Appendix 1C).

Determination: The Bypass System Alternative would have no adverse water temperature effect on juvenile or adult anadromous fish migration because water temperatures from November through February would remain similar to preproject temperatures and within the range that would support migration.

Shaded Riverine Aquatic Cover Effects. Bank armoring would remove SRA cover (Section 5.4), which provides resting areas and refuge from predators for migrating anadromous fish. Installation of rootwads, logs, and other instream structures as part of SRA cover mitigation would reestablish resting and refuge areas for migrating fish. As planted SRA cover vegetation matures, its function for migrating anadromous fish would be reestablished (Section 3.4.2). The constructed low-flow channel with channel check structures, boulders, and gravel in Segments 3A and 3B (Section 3.4.2) would provide instream cover, including resting and refuge areas for fish migrating through the sections of the river that would be armored under the Bypass System Alternative.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on anadromous fish migration because SRA cover would be installed and vegetation planted in mitigation sites and the low-flow channel with channel check structures and boulders provides habitat diversity.

5.6.4.2 Anadromous Fish Spawning and Incubation

Hydrologic and Hydraulic Effects. At flows of less than 1,500 cfs, stream depths and flow velocity would be similar to depths and velocity under existing conditions (Section 5.1, "Hydrologic and Hydraulic Consequences"). Most spawning of anadromous fish in the Guadalupe River would occur at flows of less than 1,000 cfs and would not be affected by the change in flow related to bypass operations.

Determination: The Bypass System Alternative would have no hydrologic or hydraulic effects on anadromous fish spawning and incubation because flows at which most spawning occurs would not be affected.

Channel Erosion and Deposition Effects. Channel bed deposition could occur downstream from the bypass intakes, and channel bed erosion could occur downstream from the bypass

outlets (Section 5.2.3.1). It is likely that sediment would be eroded and deposited downstream. The location of deposition of these dislocated bed materials would depend on their size as well as local hydraulic conditions. Channel maintenance flows would remain in the natural Guadalupe River channel (Section 5.1; Appendix 1B). These flows are expected to clean spawning gravel and maintain spawning habitat. Spawning gravel that is lost would be replaced (Section 3.4.3, "Bypass System Alternative – Environmental Commitments"). Monitoring channel bed elevations and gravel quantity and quality, along with observing spawning, would verify whether the approximate quantity and quality of spawning gravels present under preproject conditions are being maintained (Appendix 3).

As shown on Figure 5.2-1, the average annual sediment deficit would increase in Segments 1 and 2 with implementation of the Guadalupe River Project with Bypass System Alternative. The deficit would reduce gravel replacement rates, and gravel abundance would decline. Spawning gravel in Segments 1 and 2 constitutes a relatively small proportion of the spawning habitat on the Guadalupe River that would be affected by channel bed erosion.

Determination: The Bypass System Alternative would have less-than-significant adverse channel erosion and deposition effects on anadromous fish spawning and incubation because:

- Channel maintenance flows would remain in the natural channel
- Lost spawning gravel would be replaced
- Monitoring would verify that adverse effects of channel bed erosion and deposition remain less than significant

River Morphology Effects. Construction activities associated with grading, channel widening, and channel armoring would remove or cover about 11,200 sf of gravel (Table 5.6-3). As described in Section 5.2.3.2, the invert stabilization structures in the natural channel bed of the bypass reach would result in shorter pools and longer riffles compared to preproject conditions in Segments 3A and 3B, potentially increasing spawning habitat. Because channel maintenance flows would remain in the natural channel, it is expected that river reaches unaffected by construction of the Bypass System Alternative would maintain the existing spawning habitat. Gravels provide spawning and rearing habitat; therefore, the loss of gravel would adversely affect chinook salmon, steelhead, and other fish species. Any spawning gravels lost would be replaced to maintain the quality and quantity present under preproject conditions (Section 3.4.3, Appendix 3, and Section 4.5).

Determination: The Bypass System Alternative would have less-than-significant adverse river morphology effects on anadromous fish spawning and incubation because about half of the preproject spawning habitat would not be affected by construction and lost spawning gravels would be replaced.

Suspended Solids and Toxic Constituents Effects. Construction activities, including excavation, channel widening, bridge removal and replacement, and the construction of bypass channels, floodwalls, maintenance roads, and access ramps has the potential to temporarily increase erosion (Section 5.3.3.1). Materials used in construction or the maintenance of construction equipment, such as concrete, sealants, and oil, have the potential to spill accidentally (Section 5.3.3.2). Implementation of an SWPPP, a streambed

TABLE 5.6-3. Direct Effects of Construction on Spawning Gravel under the Bypass System Alternative and Refined Bypass System Alternative

Project Segment	Preproject Gravel Abundance (sf)	Loss of Spawning Gravel (sf)	
		Bypass System Alternative	Refined Bypass System Alternative
Segment 3A	10,600	6,500	6,500
Segment 3B	9,700	4,700	4,700
Reach A Mitigation Site	N/A[a]	0	0
Guadalupe Creek Mitigation Site	N/A[b]	–	–
Total	20,300	11,200	11,200

[a] Spawning gravel in Reach A would not be affected by the proposed mitigation and has not been surveyed.

[b] Any effects from Guadalupe Creek mitigation would be discussed in environmental documents for that project.

alteration permit and limiting in-channel construction to the nonspawning season from May 1 to October 15 (Section 3.4.3) would prevent any adverse effects on anadromous fish eggs or larvae and would therefore not adversely affect spawning success.

Determination: The Bypass System Alternative would have no adverse suspended solids or toxic constituents effects on anadromous fish spawning and incubation because measures to avoid and minimize adverse project effects would be implemented.

Water Temperature Effects. Steelhead and chinook salmon generally spawn between November and February, although chinook salmon may spawn as early as October and steelhead may spawn as late as May (Section 4.6.2). Under existing water temperature conditions (Section 4.3.3), successful steelhead spawning in the study area is limited to January and February and successful spawning of chinook salmon is limited to November or later. After implementation of the Guadalupe River Project with Bypass System Alternative, water temperatures from November through February would be similar to those of preproject conditions (Section 5.3.3 and Appendix 1C). Increases in water temperatures attributable to implementation of the Guadalupe River Project with Bypass System Alternative would be less than 1 °F during the primary spawning period and have minimal effect on spawning success. In addition, planted SRA cover vegetation on Guadalupe Creek and in Reach A would, at maturity, result in water temperatures that are cooler than under existing conditions, thereby improving overall conditions for spawning in the Guadalupe River system.

Determination: The Bypass System Alternative would have a less-than-significant adverse water temperature effect on anadromous fish spawning and incubation because water temperatures from November through February in the downtown reach would remain similar to existing temperatures and SRA cover vegetation on Guadalupe Creek and in Reach A would result in cooler water temperatures.

5.6.4.3 Resident and Anadromous Fish Rearing

Hydrologic and Hydraulic Effects. During most months, flows are much less than 100 cfs more than 90 percent of the time (Appendix 1A). Flows less than 100 cfs are therefore of

primary importance to rearing fish. The bypass diversions would not affect flows less than 1,500 cfs (Section 5.1). Flows greater than 1,500 cfs during the rearing seasons are infrequent and of short duration (Section 5.1 and Appendix 1A).

Determination: The Bypass System Alternative would have no adverse hydrologic and hydraulic effects on resident and anadromous fish rearing because the frequency, duration, and magnitude of flows of less than 1,500 cfs, which are important to rearing fish, would not change.

Channel Erosion and Deposition Effects. Channel bed deposition could occur below the bypass intakes, and erosion could occur below bypass outlets. This could alter the occurrence of gravel deposits and the proportions of riffles, runs, and pools (Figure 5.2-1 and Section 5.2.3). Because gravel deposits provide habitat for invertebrates that are the food source for rearing fish, areas scoured of these deposits may be less suitable for rearing. The gravel areas affected by changes in erosion are expected to constitute a relatively small portion of the overall rearing habitat in the Guadalupe River, although replenishment of gravel in Segments 1 and 2 would be reduced. Erosion and deposition effects on pool/riffle/run occurrence would likely be minimal because channel maintenance flows would remain in the natural channel. Monitoring gravel abundance, rearing habitat diversity, and juvenile steelhead and chinook salmon occurrence would verify that the effects of channel bed erosion and deposition on rearing habitat remain less than significant (Appendix 3).

Determination: The Bypass System Alternative would have less-than-significant adverse channel erosion or deposition effects on resident and anadromous fish rearing because:

- A small proportion of gravel areas would be affected.
- Channel maintenance flows would remain in the natural channel.
- Monitoring would verify that gravel abundance and rearing habitat diversity would be maintained.

River Morphology Effects. Armoring the stream channel in Segments 3A and 3B would result in a decrease in gravel abundance (Table 5.6-3). Gravel provides cover for larval and juvenile fish and habitat for invertebrates that are a food source for fish. Loss of gravel, therefore, would reduce rearing habitat quality and quantity. Armoring the stream channel would also reduce pool size and increase riffles and runs. Although the response of fish to the change in the resulting channel form cannot be quantified, some species would be expected to benefit while others would expected to be adversely affected. Incorporation of check structures and boulders in the constructed low-flow channel would recreate habitat diversity, providing resting areas, refuge from predators, and cover. In addition, lost gravel would be replaced. Monitoring gravel abundance, rearing habitat diversity, and juvenile steelhead and chinook salmon occurrence would verify that the effects of armoring would be less than significant.

Determination: The Bypass System Alternative would have a less-than-significant adverse river morphology effect on resident and anadromous fish rearing because replacement of gravel and construction of the trapezoid/boulder low-flow channel would reestablish the diversity of rearing habitat.

Suspended Solids and Toxic Constituents Effects. Implementation of an SWPPP and limiting in-channel construction to the summer low-flow season would control erosion and reduce the likelihood of spilling construction materials into the river, avoiding adverse effects from suspended solids and toxic constituents.

Determination: The Bypass System Alternative would have less-than-significant suspended solids or toxic constituents effects on resident and anadromous fish rearing because measures to minimize adverse project effects would be implemented.

Water Temperature Effects. Implementation of the Guadalupe River Project with Bypass System Alternative is expected to increase water temperatures in the downtown reach during the rearing season for chinook salmon and steelhead (Section 5.3.3.4, "Water Temperature"). Water temperature increases are expected to be greatest in Segments 1 and 2 downstream from Coleman Avenue.

Juvenile chinook salmon rear in the Guadalupe River from February to June (Section 4.6.2) and most juveniles probably migrate from the river prior to May. Postproject simulated water temperatures from March to May for the Guadalupe River Project with Bypass System Alternative are within the range that would support rearing of juvenile chinook salmon (Appendix 1C).

During the 10 years immediately after construction of the Guadalupe River Project and prior to the substantial growth of SRA cover vegetation, water temperatures during summer are expected to increase by several degrees (Section 5.3.3.4, "Water Temperature"). This increase in water temperatures has the potential to reduce survival of juvenile steelhead rearing in Segments 1, 2, and 3 and Reach A from March through October (Appendix 1C). Nevertheless, these postproject increases in water temperature would not be expected to significantly affect the abundance and distribution of steelhead in the Guadalupe River system for several reasons:

- Water temperature in some segments, as represented in the water temperature model (JSATEMP), would be within the range that would support rearing of juvenile steelhead (Appendix 1C).
- Juvenile steelhead could move, relocating from warm areas in Segments 1, 2, and 3 to habitat with more suitable water temperatures, including deeper pools and local areas of cool water inflows in Segments 1, 2, and 3 and cooler upstream reaches and tributaries.
- The recent improvements in fish passage, discussed in Section 5.6.4.1, "River Morphology Effects," will increase the amount of suitable habitat available to fish in the upper Guadalupe River watershed areas. These areas are accessible to adult steelhead and chinook salmon and usually have water temperature conditions that are optimal for sensitive life stages.

Water temperatures would cool in the entire project area following growth of SRA cover mitigation plantings and concurrent increase in shaded stream surface. Shade would begin to cool water temperatures immediately after establishment of new vegetation. The shade and cooling effect would increase over time and maximum shade value is expected at maturity of the SRA cover vegetation, within about 40 years. Postmitigation water temperatures in the project area would be lower than postconstruction water temperatures.

However, postmitigation water temperatures in the downtown reach are expected to remain 2.5 °F to 3.5 °F warmer during the summer. Temperature conditions, however, could support juvenile steelhead most of the time. Water temperature in the Guadalupe Creek and Reach A mitigation sites would be cooler under postproject conditions because of the increased shade provided by maturation of planted SRA cover vegetation. The cooler conditions would improve habitat quality and increase the quantity of available rearing habitat.

Monitoring of water temperature, shaded stream surface, and juvenile steelhead occurrence, along with evaluating monthly and short-term thermal suitability, would verify whether the adverse effects of increased water temperature on juvenile steelhead survival remain less than significant (Appendix 3).

Determination: The Bypass System Alternative would have a less-than-significant adverse water temperature effect on rearing resident and anadromous fish because:

- Postproject temperatures from March to May would be within the range that would support juvenile chinook salmon
- Though water temperatures could increase immediately after construction, juveniles would be able to move to more suitable locations and have additional suitable habitat available
- SRA cover mitigation plantings would increase shade and lower water temperatures in the project area
- Monitoring would verify that effects remained less than significant

Shaded Riverine Aquatic Cover Effects. The bypasses have been included in the Bypass System Alternative to minimize the need for riverbank and riverbed armoring, thereby reducing the project effects on SRA cover, riparian resources, and fish and wildlife (Section 3.4.1). However, 8,580 lf of bank armor and 4,433 lf of bottom armor are still required for the Guadalupe River Project with Bypass System Alternative (Section 5.4.3). Armoring and loss of SRA cover would reduce rearing habitat values, including resting areas, refuge from predators, and food availability. SRA cover vegetation would be planted onsite and offsite in Reach A and at the Guadalupe Creek mitigation site (Section 3.4.3, "Environmental Commitments"). Planted vegetation would reestablish overhead cover and provide instream cover as the vegetation matures. Losses of riparian vegetation and SRA cover vegetation during construction would be avoided by implementing a vegetation protection plan to protect trees outside of the construction area (Section 3.4.3). Bypass System Alternative The SRA cover vegetation, biotechnical features such as logs and rootwads, and the boulders placed in the constructed low-flow channel would replace instream and overhead cover and resting areas for fish and habitat for aquatic food organisms.

Determination: The Bypass System Alternative would have less-than-significant SRA cover effects on resident and anadromous fish rearing because instream SRA cover would be installed, SRA cover vegetation planted, and a vegetation protection plan implemented. All environmental commitments have been incorporated into the Bypass System Alternative.

5.6.5 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative, except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would include the same environmental commitments identified for the Bypass System Alternative (Section 3.4.3, "Environmental Commitments").

Refined Bypass System Alternative effects on anadromous and resident fish would be the same as or slightly less than under the Bypass System Alternative. The effects on fish could be slightly less because less riparian vegetation and SRA cover vegetation would be removed, resulting in a smaller effect on water temperatures. About 200 feet more of natural bank and associated instream cover would remain. However, because the Refined Bypass System Alternative would result in a relatively small reduction in the amount of riparian vegetation and SRA cover vegetation that would be removed, effects on water temperatures and instream cover would not be substantially different than under the Bypass System Alternative. The effects on fish migration, spawning, incubation, and rearing from changes in hydrologic and hydraulic conditions, channel erosion and deposition, and river morphology would be the same as under the Bypass System Alternative.

Determination: The Refined Bypass System Alternative would have nearly the same effects on adult and juvenile anadromous fish migration, anadromous fish spawning and incubation, and resident and anadromous fish rearing as described for the Bypass System Alternative. These effects are considered less than significant.

5.7 Land Use and Planning

5.7.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of land use effects and consistency with governmental plans, policies, and regulations. These criteria are based on the CEQA Guidelines and CEQ's NEPA regulations. The Guadalupe River Project would result in a significant effect on land use and planning if it would:

- Physically divide an established community
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance adopted for the purpose of avoiding or mitigating an environmental effect
- Conflict with any applicable habitat conservation plan or natural community conservation plan

5.7.2 No-Action Alternative

Under the No-Action Alternative, Segment 3C Phase 2 will be constructed under previous environmental approvals (U.S. Army Corps of Engineers, 1991). Construction of Segment 3C Phase 2 components will not physically divide an established community because the

components will be located under I-280 and therefore will not be located in an established community. Segment 3C Phase 2 components are considered compatible with established land use policies because they include features that will enhance recreational opportunities in the area and contribute to other desirable land uses. Operation of the existing flood protection components would not conflict with applicable land use plans, policies, or regulations.

Determination: The No-Action Alternative would have no adverse effect on land use and planning because it would not change or conflict with existing land uses.

5.7.3 Bypass System Alternative

Under the Bypass System Alternative, construction and operation of Segments 3A, 3B, and 3C Phase 3 would not physically divide an established community. The construction effects would be short-term, and the operational effects would not be noticeable from adjacent land uses because the bypass system would be located underground. Furthermore, the residential neighborhood along River Street has been removed, and there is no other nearby residential neighborhood that would experience the direct effects of construction.

The Bypass System Alternative would be consistent with existing plans, policies, and regulations for land use, including the San Jose General Plan and the Guadalupe River Park Master Plan. When completed, the Guadalupe River Project would facilitate the City's plan to change the land uses in the area from industrial to office and commercial uses by providing flood protection and recreation features for local businesses. The Bypass System Alternative would not conflict with habitat conservation plans or natural community conservation plans because the Bypass System Alternative does not occur in an area covered by either type of plan.

Determination: The Bypass System Alternative would have no adverse effect on land use and planning because it would not change or conflict with existing land uses.

5.7.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would reduce the amount of riparian vegetation and SRA cover vegetation that would be removed under the Bypass System Alternative by 0.35 acre and 72 lf, respectively. The east bank recreational trail would be routed through the intersection of New Julian Street and North River Street to ensure continuous public access to the east side of the Guadalupe River. The Refined Bypass System Alternative would include the same environmental commitments identified for the Bypass System Alternative (Section 3.4.3, "Environmental Commitments").

Effects on land use under the Refined Bypass System Alternative would be the same as described under the Bypass System Alternative. The Refined Bypass System Alternative would be consistent with existing plans, policies, and regulations for land use, including the San Jose General Plan and the Guadalupe River Park Master Plan. Although this alternative would require a change in the current design of the recreational trail that passes under the New Julian Street Bridge, it would be compatible with the objectives of the Guadalupe River

Park Master Plan because the trail could be rerouted to cross New Julian Street at the intersection with North River Street.

Determination: The Refined Bypass System Alternative would have no adverse effect on land use and planning because it would not change or conflict with existing land uses.

5.8 Recreation, Public Access, and Visual/Aesthetic Resources

5.8.1 Criteria for Determining Significance of Effects

The following criteria were used to determine the significance of effects on recreational resources and visual resources. These criteria are based on the CEQA Guidelines and CEQ's NEPA regulations. The Guadalupe River Project would result in a significant effect on recreational resources if it would:

- Substantially affect recreational opportunities by causing a change in riverflows or water-surface elevations
- Include operational or construction-related activities that would cause a substantial long-term disruption of any institutionally recognized recreational activities

The Guadalupe River Project would result in a significant effect on visual resources if it would:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources along a scenic highway, including, but not limited to, trees, rock outcrops, and historic buildings
- Substantially degrade the visual character or quality of the site and its surroundings or
- Create a new source of substantial light or glare that would adversely affect daytime or nighttime views of the area

5.8.2 No-Action Alternative

Under the No-Action Alternative, no additional flood protection components would be constructed, thereby avoiding temporary disruptions of recreation. Recreational opportunities in Segments 1, 2, 3C Phase 1, and 3C Phase 2 of the Guadalupe River have been enhanced by the public access, including trails and the Overlook Plaza, that was incorporated into the design of the flood protection components in these reaches. Mitigation plantings in Segments 1 and 2 have now had an opportunity to establish and have improved the postconstruction viewshed. Under the No-Action Alternative, recreational improvements such as trails will not be constructed in Segments 3A and 3B.

Determination: The No-Action Alternative would have no adverse effect on recreation, public access, or visual resources because opportunities for recreation and public access and the visual character of the river corridor would not change.

5.8.3 Bypass System Alternative

5.8.3.1 Construction

Construction-related activities along the Guadalupe River would result in a temporary disruption of river-related recreational activities in Segments 3A and 3B. Construction activities in the river channel would take place only during the summer low-flow period and would be completed in two summers. The public would not have access to Segments 3A and 3B during the construction periods.

Recreational opportunities along Segments 3A and 3B are currently limited because public access is provided only by informal pathways; riparian vegetation further interferes with public access. Over the short term, construction of the bypass system would affect use of the informal pathways. Over the long term, however, access to these reaches of the river would increase because trails would be constructed as part of the Bypass System Alternative.

Determination: Construction of the Bypass System Alternative would have a less-than-significant adverse effect on recreation and public access because disruption of public access would only be short term.

5.8.3.2 Operation and Maintenance

The inlets and outlets to the bypass system would not be fenced; access to the bypass culverts would not be physically controlled, although signs would be posted warning the public that entry to the bypass is prohibited. In addition, the Corps and SCVWD will install a warning system that will provide adequate warning to allow persons trespassing in the bypass time to exit during a flood event.

Several options for preventing human ingress into the box culvert were considered by the Corps, SCVWD, City of San Jose and the Redevelopment Agency of San Jose including trash racks and roll-up doors. These options were eliminated from consideration because of the potential for these structures to become obstructed during floods and not operate as anticipated, and because of the required additional maintenance costs.

The City of San Jose Police Department periodically patrols isolated areas for illegal activities and homeless encampments. The bypass system would be included in these patrols. While the police may need to patrol this additional area, there would not likely be a substantial increase in the level of patrol effort and the inclusion of the no trespassing signs would allow police officers to enforce the law more easily (Dalaison, pers. comm.).

The recreational trails that would be constructed under the Bypass System Alternative would enhance public access to the riparian corridor (Figure 3.4-9). As discussed below, the new trails are consistent with the Guadalupe River Park Master Plan. The trails would connect to the Woz Way to Park Avenue bypass reach outlet, which is being designed as an overlook that would enhance opportunities for viewing the river. The effects of improved access to the river corridor are considered beneficial.

The improved access provided by the trail system could result in additional public use of the riparian corridor. This additional use could have an adverse effect on the natural resources located within the riparian corridor, as indicated in Section 5.5, "Biological

Resources – Wildlife." However, this effect is considered less than significant for several reasons:

- Public access to mitigation sites would be restricted by installing signs and fencing, designating access routes, and providing barrier plantings
- Recreational trails will help concentrate recreational use in specific corridors that are outside wildlife habitat area
- The potential for poaching is only a minor concern based on the low number of people who currently use the river for fishing and because CDFG enforces fishing regulations
- Few people boat on the Guadalupe River, and boating on the river is not encouraged
- The City will modify its park management practices if the river corridor is overused (Duenas, pers. comm.).

The flood training walls in Segment 3C Phase 3 would not affect recreational opportunities along the Guadalupe River. The flood training walls would be located outside the river channel and would therefore not impede access to the river or conflict with the Guadalupe River Park Master Plan.

Excavation of sediment from the low-flow channel under the Bypass System Alternative could result in the temporary disruption of recreational uses. For instance, trails might need to be temporarily closed. However, maintenance activities within the channel would be localized, temporary, and occur only during the summer low-flow period.

Determination: The Bypass System Alternative would have a beneficial effect on recreation by enhancing public access and recreation opportunities along the river corridor.

Determination: Maintenance activities associated with the Bypass System Alternative would have a less-than-significant adverse effect on recreation and public access because maintenance would be localized and of short duration.

5.8.3.3 Boating

Implementation of the Bypass System Alternative would not substantially alter boating opportunities on the Guadalupe River. The low-flow channel and invert stabilization structures would be submerged under moderate and high riverflows and thus would not restrict boating during the period when boating has typically occurred. The low-flow channel and invert stabilization structures would be visible and above water level during low flows, but would not restrict boating because they are designed to allow small watercraft to pass. At very low flows, the river will continue to be unnavigable, as it is under existing conditions. Structures constructed under the Bypass System Alternative would be maintained during very low-flow periods, when boating on the river is not possible.

Boating in urban waterways during high-flow events is generally considered unsafe because the risk of watercraft or their operators being trapped by riparian vegetation or engineered structures increases during high flows; the drowning hazard is greatest during high-flow events. At flows in excess of 1,500 cfs, as described in Section 3.4.2, "Construction Features," boaters in the vicinity of the proposed bypass inlets would need to avoid the inlet structures

or risk possible entrapment and drowning. Safety precautions, such as posting warning signs upstream from the inlets, would be implemented, and boating in the Guadalupe River Park area is discouraged by the City.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on boating because opportunities for boating during low-flow conditions would be the same as under existing conditions and safety precautions would be implemented to warn boaters of the risk of entering the bypass during high-flow conditions.

5.8.3.4 Visual/Aesthetic Resources

Implementation of the Bypass System Alternative would change the visual character of the area around Segments 3A and 3B through the construction of the bypass inlets and outlets, the low-flow channel, the invert stabilization structures, and recreation trails, and the removal of riparian vegetation. The flood protection infrastructure in downtown San Jose requires the use of concrete and other engineered products to direct and control floodflows, and some people may not regard these features as aesthetically pleasing.

Temporary features providing shade may be required in Segments 2, 3A, and 3B if monitoring indicates that additional measures are needed to maintain water temperatures at levels suitable to support anadromous fish. Shade features may include boxed trees and/or canopies constructed of canvas or other appropriate materials. These features would be placed along or over the river during the dry season, generally March through October, and would be removed prior to flood season. Shade features would be constructed and placed in such a manner as to not substantially detract from the visual character of the river corridor. The temporary shade features would no longer be necessary once SRA cover vegetation has been established.

The Bypass System Alternative will result in 5,532 lf of bank armoring, 2,635 lf of riverbed armoring and approximately 16,000 lf of recreation trails. The riparian corridor would become more visible and have a combination of natural vegetation and engineered products. The increase in views of the water from recreational trails is considered a positive effect on the visual character of the area. The increase in views of armored riverbank and riverbed is considered a negative effect on the visual character of the area. Incorporating improvements indicated in the Guadalupe River Park Master Plan (City of San Jose, 1989), such as additional plantings in the gabions, would help to make the armored riverbed in Segment 3B more aesthetically pleasing. The inlets to the box culverts will be integrated into the riverbank armoring and will be visible from the west side of the Guadalupe River, from the West Santa Clara Street Bridge, and from the St. John Street Bridge. The views of the inlets to the box culverts are considered a negative effect on the visual character of the area in the vicinity of the inlets. However, SCVWD, Redevelopment Agency, and City are working together to include design features that would make the entrances more aesthetically pleasing. These design features could include adding pigmentation to the concrete, applying surface treatments such as texture or shaping, and narrowing the overall inlet structure based on updated hydraulic modeling. Overall, implementation of the Bypass System Alternative would neither substantially damage scenic resources along the Guadalupe River nor substantially degrade the existing visual character of the project site. Finally, the armored riverbed would not create a new source of substantial light or glare.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on visual resources because the visual character of the river would not be substantially changed and physical modifications would be designed to be aesthetically pleasing.

5.8.3.5 Consistency with Plans and Policies

The Bypass System Alternative is consistent with existing plans and policies. Specifically, the Bypass System Alternative is being developed in conjunction with the Guadalupe River Park Master Plan, so it is compatible with the objectives of that plan, as discussed in Section 5.7.3, "Bypass System Alternative," of this document. The plan evaluated in the 1989 EIR (City of San Jose, 1989) would require modifications to incorporate the proposed bypass system; however, these modifications would be consistent with the original objectives of the plan because they would provide enhanced recreational opportunities along the river. The Bypass System Alternative is also considered consistent with the San Francisco Bay RWQCB's Basin Plan because it would result in improved opportunities for water-enhanced and water-dependent activities along the river.

Determination: The Bypass System Alternative would be consistent with existing land use plans and policies.

5.8.4. Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The east bank recreational trail would be routed through the intersection of New Julian Street and North River Street to ensure continuous public access to the east side of the Guadalupe River.

Effects on existing recreation and existing visual resources under the Refined Bypass System Alternative would be similar to the effects of the Bypass System Alternative. These effects include the long-term beneficial effects associated with increasing public access to Segments 3A and 3B and the short-term adverse effects associated with construction and use of temporary shade structures. Although the proposed east bank recreational trail would not pass under the New Julian Street Bridge, the trail would continue to be compatible with the objectives of the Guadalupe River Park Master Plan because the trail will still be accessible and recreational users will be able to cross New Julian Street at the intersection with North River Street. Effects on boating would be the same as under the Bypass System Alternative because the amount of riverbed armoring would not change.

Visual effects of the Refined Bypass Alternative are similar to the effects under the Bypass System Alternative; however, there will be less bank armoring under this alternative. Overall, implementation of the Refined Bypass System Alternative would neither substantially damage scenic resources nor substantially degrade the existing visual character of the project site.

Determination: The Refined Bypass System Alternative would have a less-than-significant adverse effect on recreation and public access during construction and a beneficial effect on

recreation and public access after construction is completed. The Refined Bypass System Alternative would have a less-than-significant adverse effect on visual resources.

5.9 Transportation and Traffic

5.9.1 Criteria for Determining Significance of Effects

The following criteria were used to evaluate the significance of effects on transportation and traffic. These criteria are based on the CEQA Guidelines and professional judgment. The Guadalupe River Project would result in a significant effect on transportation and traffic if:

- Street closures would result in a redistribution of traffic that would cause peak-hour traffic volumes to exceed available road capacity on any roadways
- A reduction in the supply of parking spaces would result in a demand for parking spaces that exceeds the supply
- Construction would result in disruption of UPRR lines through the project area

Project construction activities could affect traffic by adding vehicle traffic associated with commute trips by construction employees and trips by construction vehicles on the local roadways, by increasing congestion levels on roads crossed by the project during periods of construction-related traffic, and by temporarily preventing the use of existing parking areas.

The traffic-related effects of the Guadalupe River Project were evaluated based on a screening criterion recommended by the Institute of Transportation Engineers (1989) for assessing the effects of development projects that create permanent traffic increases. This screening criterion indicates that in the absence of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more additional peak-direction trips to or from the development site during the adjacent roadway's peak hours or the development's peak hours. This criterion is considered conservative for construction projects that create temporary traffic increases. The criterion is intended to assess the effect of a traffic mix consisting primarily of automobiles and light trucks. Because construction of the Guadalupe River Project will require a large number of heavy trucks, one trip by a heavy truck was assumed to equal two vehicle trips in this analysis. The evaluation also assumed that peak-hour traffic equals a maximum of 10 percent of average daily traffic. This assumption was based on recommendations by the Institute of Transportation Engineers (Pine, 1992).

As described above, a conservative approach was used to evaluate the project's effects on transportation and traffic. Although the Guadalupe Creek mitigation site is scheduled for construction in fall 2000 and Segments 3A, 3B, and 3C Phase 3 would be constructed during 2002 through 2004, traffic effects were evaluated as if construction at the two sites would take place concurrently.

5.9.2 No-Action Alternative

Under the No-Action Alternative, construction of Segment 3C Phase 2 could have minor effects on traffic and circulation patterns. These effects have been evaluated by the Corps in

previous environmental documents (U.S. Army Corps of Engineers, 1985). The No-Action Alternative would not affect local or regional traffic and circulation patterns.

Determination: The No-Action Alternative would result in a less-than-significant adverse effect on transportation and traffic.

5.9.3 Bypass System Alternative

5.9.3.1 Roadway Capacity

The Bypass System Alternative would generate approximately 20 commute trips by construction employees during both the a.m. and p.m. peak commute hours. In addition, approximately 95 one-way trips per day by heavy trucks would be required to haul material excavated from the project site to the Zanker Road or Newby Island disposal sites. Based on the conservative approach to the traffic analysis described above, 95 one-way trips by heavy trucks were assumed to equal 190 one-way vehicle trips per day.

Along with the commute trips, as much as 15 percent (27) of the truck trips would occur during the a.m. and p.m. peak commute hours. In combination, the commute trips to the project site and the truck trips to the disposal sites would generate approximately 47 trips during both the a.m. and p.m. peak hours. This total is below the significance threshold of 100 peak-hour trips per day.

Determination: Construction of the Bypass System Alternative would have a less-than-significant adverse effect on roadway capacity because the number of construction-related trips would not substantially change the capacity of the roadways.

5.9.3.2 Traffic Circulation

This analysis assumes that the closure of St. John Street would result in a diversion of traffic to West Santa Clara and New Julian Streets in an amount proportionate to existing volumes on those roads. Consequently, traffic volumes would increase to 13,700 vehicles per day (vpd) on New Julian Street and to 27,300 vpd on West Santa Clara Street. Assuming that 10 percent of the traffic would be during the a.m. peak commute hour and 10 percent during the p.m. peak commute hour, peak-hour volumes would equal 1,370 on New Julian Street and 2,730 on West Santa Clara Street. It is also assumed that large public events at the San Jose Arena could generate similar traffic volumes. At an assumed maximum capacity of 1,000 vehicles per lane, each road has a peak-hour capacity of 4,000 vehicles (Pine, 1992).

During construction, two lanes of New Julian Street and two lanes of West Santa Clara Street would be closed for as long as 2 months, reducing peak road capacity to 2,000 vehicles per hour for each road. These road closures have the potential to result in a peak-hour demand that exceeds the capacity of West Santa Clara Street, which could result in the diversion of traffic from West Santa Clara Street to New Julian Street; were that to happen, the peak-hour level of service on New Julian Street would be further reduced.

To reduce this effect, the Corps and SCVWD will ensure that three lanes of West Santa Clara Street and New Julian Street remain open during a.m. and p.m. peak commute periods and during large events at the San Jose Arena, as necessary, and that signs are posted warning commuters of potential delays; two of the three lanes will be open in the direction of peak traffic flow. As required by the City, this measure would be implemented during the peak

travel periods of 6:30 a.m. to 8:30 a.m. and 4:30 p.m. to 6:30 p.m. and during large events at the San Jose Arena, as necessary (City of San Jose, 1994). Prior to the start of construction, signs would be posted on New Julian and West Santa Clara Streets warning commuters of potential delays, with the construction periods clearly displayed. During construction, signs would be posted at access points to West Santa Clara Street notifying drivers of alternate routes. This measure would help divert traffic around potentially congested areas on West Santa Clara and New Julian Streets.

During flood events, the Almaden Boulevard, Vine Street, and Almaden Avenue would be closed for approximately 24 to 48 hours during operational flood events. In addition, construction activities on Julian Street and Santa Clara Street will be designed to ensure continued pedestrian movement through the construction zone with minimal disruption.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on traffic circulation because:

- Corps and SCVWD would ensure that three lanes of traffic remain open during peak a.m. and p.m. hours and during large events at the San Jose Arena
- Signs would be posted warning commuters of delays
- Road closures at Almaden Boulevard, Vine Street, and Almaden Avenue during a flood event would be the same under existing conditions

5.9.3.3 Parking

The proposed bypass would be constructed across a parking area for a commercial development between West Julian Street to the south, UPRR to the north, the Guadalupe River to the west, and the Guadalupe Parkway to the east. Construction of the bypass would temporarily remove an estimated 75 parking spaces, or approximately 12.8 percent of the total number of parking spaces, at this commercial development for approximately 2 months. If the vacancy rate for the new buildings served by this parking area is less than 12.8 percent during project construction, demand for parking at the site would exceed supply, resulting in a significant short-term effect on the availability of parking spaces. No other parking areas would be affected during construction.

The Corps and SCVWD would provide shuttle service between the commercial development and a parking area, or areas, with adequate capacity to handle 75 additional vehicles during the time the affected parking spaces were not usable. The shuttle service would be provided continuously during normal business hours.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on parking because, if necessary, the Corps and SCVWD would provide temporary parking.

5.9.3.4 Railroad Operation

Under the Bypass System Alternative, the UPRR No. 3 Bridge would be permanently removed and the UPRR No. 4 Bridge would be removed and replaced. The new UPPR No. 4 Bridge would carry two sets of railroad tracks rather than one and would therefore be

wider than the existing bridge. To minimize disruption to railroad traffic, construction at the two bridge sites will be scheduled so that one of the bridges remains open at all times.

Railroad traffic normally crossing the Guadalupe River on the UPRR No. 4 Bridge would be diverted to the UPRR No. 3 Bridge during removal and reconstruction of the UPRR No. 4 Bridge and construction of the bypass, which would pass under the eastern approach to this bridge. After the wider UPRR No. 4 Bridge and the bypass under the eastern approach to the bridge have been built, railroad traffic that previously crossed the Guadalupe River on the UPRR No. 3 Bridge would be permanently routed over the UPRR No. 4 Bridge. The UPRR No. 3 Bridge would then be removed. At least one track would remain in use during the entire construction period, providing continuous operation of the UPRR over the Guadalupe River.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on railroad operation because one railroad bridge would remain open at all times.

5.9.4. Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The effects of the Refined Bypass System Alternative on roadway capacity would be slightly less than the effects described for the Bypass System Alternative. Fewer truck trips would be necessary to haul excavated materials to disposal sites. The effects on roadway capacity remain less than significant.

Effects on traffic and circulation during construction would be the same as described for the Bypass System Alternative. These effects would be reduced to a less-than-significant level because adequate travel lanes on West Santa Clara Street and New Julian Street would remain open during peak travel periods.

The significant short-term effects on parking during construction would be the same as described for the Bypass System Alternative. This effect would be reduced by providing temporary offsite parking and shuttle service.

The effect on UPRR railroad operations as a result of removing the UPRR No. 3 Bridge and replacing the UPRR No. 4 Bridge would be the same as described for the Bypass System Alternative.

Determination: The Refined Bypass System Alternative would result in a less-than-significant adverse effect on roadway capacity, traffic and circulation, parking, and railroad operation.

5.10 Air Quality

5.10.1 Criteria For Determining Significance of Effects

The following criteria were used to determine the significance of effects on air quality. These criteria are based on the CEQA Guidelines. The Guadalupe River Project would result in a significant effect on air quality if it would:

- Conflict with or obstruct implementation of any applicable air quality plan
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Expose sensitive receptors to substantial concentrations of pollutants
- Result in substantial emissions
- Result in deterioration of air quality
- Create objectionable odors

The BAAQMD CEQA guidelines do not require that construction emissions be quantified when the effects of a project are analyzed (Bay Area Air Quality Management District, 1996). However, emissions must be quantified in this case because the Bypass System Alternative is a Federal project that requires a conformity determination. Emissions exceeding the Federal conformity thresholds of 50 tons per year of ROG, 100 tons per year of NO_x or 100 tons per year of CO are considered significant and must be mitigated. Mitigation measures are based on recommendations in the BAAQMD guidelines.

5.10.2 No-Action Alternative

Under the No-Action Alternative, construction of the Segment 3C Phase 2 components could have minor effects on air quality. These effects have been evaluated by the Corps in previous environmental documents (U.S. Army Corps of Engineers, 1985). No other activities under the No-Action Alternative would affect air quality.

Determination: The No-Action Alternative would have a less-than-significant adverse effect on air quality.

5.10.3 Bypass System Alternative

Building the proposed bypass system would entail a number of activities that have the potential to affect air quality. These include excavation, hauling of excavated materials and fill, and various construction activities.

The BAAQMD guidelines were used to estimate construction emissions. Construction emissions were estimated separately for three key project components: excavation associated with the Bypass System Alternative and demolition and removal of the St. John Street Bridge and the Old Julian Street Bridge from the downtown segment of the Guadalupe River. Vehicle emissions and dust generation were estimated separately for each project component; vehicle emissions included both onroad and offroad vehicle traffic.

Table 5.10-1 summarizes the assumptions used to estimate onroad mobile-source emissions related to construction. Vehicle miles traveled (vmt) were first estimated by multiplying the annual number of round trips required per site by the round-trip distance from each construction site to the Zanker Road and Newby Island disposal sites. The average round-trip distance from the Guadalupe River site to the disposal sites is 16.4 miles. The total vmt per year were multiplied by heavy-duty truck emission rates to obtain onroad vehicle emission estimates.

Table 5.10-2 shows the worst-case estimates for pollutant emissions associated with the Bypass System Alternative. Emissions of ROG, NO_x, and CO would be below the conformity thresholds of 50 tons of ROG per year, 100 tons of NO_x per year, and 100 tons of CO per year. No conformity thresholds for PM10 apply because the San Francisco Bay Area Air Basin is currently in attainment for Federal PM10 standards. Construction-related projects occurring in the SFBAAB are considered by the BAAQMD to result in a significant impact on air quality unless they include all feasible PM10 control measures as required by the BAAQMD. Consequently, construction emissions associated with the Bypass System Alternative are considered to have a significant effect on air quality.

To reduce the effect on air quality resulting from PM10 emissions during construction, the Corps and SCVWD would implement the following measures, which are contained in the BAAQMD's Feasible Control Measures for PM10 Emissions from Soil Removal Activities (Bay Area Air Quality Management District, 1996):

- Water all active construction sites at least twice daily
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard
- Sweep daily with water sweepers all paved access roads, parking areas, and staging areas at construction sites
- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on air quality because emissions for ROG, NO_x, and CO would be below the conformity thresholds and Corps and SCVWD would implement measures to reduce the effects of PM10 emissions.

TABLE 5.10-1. Construction Activity Assumptions for the Bypass System Alternative and the Refined Bypass System Alternative

This table provides information on how the vehicle miles traveled per year were calculated. The vehicle miles traveled per year were used to calculate ROG and NO_x emissions that would be generated by construction of the Bypass System Alternative and the Refined Bypass System Alternative.

	Material Excavated		Trips and Miles Traveled		
Activity	**Cubic Yards Per Year**	**Cubic Yards per Truck**	**Round Trips per Year**	**Miles per Round-Trip**	**Vehicle Miles Traveled per Year**
Guadalupe River Project – Fill Removal	238,000	15	15,867	16.4	260,213
Guadalupe River – Bridge Removal	4,075	7.5	543	16.4	8,911
Totals	**242,075**		**16,410**		**269,124**

Notes: Estimated exhaust emissions are for both onsite construction equipment and trucks used to haul soil to local landfills (Zanker Road and Newby Island).

TABLE 5.10-2. Summary of Pollutant Emissions for the Bypass System Alternative and the Refined Bypass System Alternative (tons per year)
This table indicates that ROG, NO_x, and CO generated by construction of the Bypass System Alternative would be below conformity thresholds for each pollutant.

	Dust Associated with Soil/Debris Removal		Exhaust Emissions			
	Guadalupe River Fill	Guadalupe River Bridge	Guadalupe River Fill	Guadalupe River Bridge	Total Emissions	Conformity Threshold
ROG	N/A	N/A	1.3	0.9	2.2	50
No_x	N/A	N/A	14.9	12.4	27.3	100
CO	N/A	N/A	2.1	0.1	2.2	100
PM10	6.0	3.5	0.2	0.01	9.71	N/A

Note: Onroad exhaust emissions estimates are based on assumptions included in Table 5.10-1. Offroad exhaust emissions assume the use of excavation equipment for fill removal and cranes for bridge demolition. Dust emissions estimates assume that a maximum of 3 acres of earth would be disturbed at any one time and that soil would be excavated and bridges demolished at the Guadalupe River Project site over a 9-month period.

N/A = not applicable

Source: Bay Area Air Quality Management District, 1995.

5.10.4. Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative, except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would result in effects on air quality that would be similar to or slightly less than the effects described for the Bypass System Alternative. Less material would be excavated and transported from the construction site, resulting in fewer emissions. As indicated in Table 5.10-2, emissions of ROG, NO_x, and CO would be below the conformity thresholds of 50 tons of ROG per year, 100 tons of NO_x per year, and 100 tons of CO per year.

Construction emissions of PM10 associated with constructing the Refined Bypass System Alternative would remain significant. Implementing the BAAQMD's Feasible Control Measures for PM10 Emissions for soil removal activities would reduce the effects on air quality resulting from PM10 emissions.

Determination: The Refined Bypass System Alternative would have a less-than-significant adverse effect on air quality for the same reasons listed under the Bypass System Alternative.

5.11 Noise

5.11.1 Criteria For Determining Significance of Effects

The following criteria were used to determine the significance of noise-related effects. These criteria are based on the CEQA Guidelines. The Guadalupe River Project would have a significant effect on noise if it would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance or in applicable standards of other agencies
- Expose persons to excessive groundborne vibration or groundborne noise levels
- Cause a substantial permanent increase in ambient noise levels in the vicinity above levels existing without the project, or
- Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project

Noise effects were evaluated based on standards specified in the San Jose General Plan (City of San Jose, 1994).

Noise effects were estimated on the basis of the proposed timing and duration of various construction activities. Aggregate noise levels resulting from the use of construction equipment and haul trucks were not estimated quantitatively because the Bypass System Alternative would require only a minimal amount of equipment and a small number of trucks. Additionally, excavation and hauling would be done only during daytime hours.

5.11.2 No-Action Alternative

Under the No-Action Alternative, construction of the Segment 3C Phase 2 components could have a minor effect on noise conditions. These effects have been evaluated by the Corps in previous environmental documents (U.S. Army Corps of Engineers, 1985). No other activities would take place under the No-Action Alternative that would affect noise.

Determination: The No-Action Alternative would have a less-than-significant adverse effect on noise.

5.11.3 Bypass System Alternative

Construction associated with the Bypass System Alternative, would require excavation and other earthmoving activities, as well as demolition and removal of the St. John Street and Old Julian Street bridges. Excavated and demolished materials would need to be hauled to nearby disposal sites at Zanker Avenue and Newby Island. The operation of demolition equipment, construction equipment, and haul trucks would result in a temporary increase in noise levels during daytime hours. Additional construction activities could also contribute to the temporary daytime noise-level increase. The noise levels associated with construction of the Segment 3A and Segment 3B components would increase during 9 months of each construction year for the projected 2-year construction period and such noise would only occur during daylight hours.

Noise generated by earthmoving and construction activities is expected to meet the City's noise-level objectives. Furthermore, land uses in the vicinity of the Bypass System Alternative do not support noise-sensitive activities.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on noise because construction-related noise would occur during daylight hours and not exceed the City's noise-level objectives.

5.11.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative, except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would result in noise effects that would be slightly less than the effects described for the Bypass System Alternative because less material would be excavated and transported from the construction site. Noise generated during construction is expected to meet the City's noise-level objectives. In addition, land uses in the vicinity of the Refined Bypass System Alternative do not support any noise-sensitive activities.

Determination: The Refined Bypass System Alternative would have a less-than-significant adverse effect on noise for the same reasons listed under the Bypass System Alternative.

5.12 Public Services

5.12.1 Criteria for Determining Significance of Effects

The following criteria were used to determine the significance of impacts on public services. These criteria are based on the CEQA Guidelines and on CEQ's NEPA regulations. The Guadalupe River Project would have a significant effect on public services if it would:

- Cause a significant disruption of public services
- Affect the provision of or need for governmental facilities
- Affect the ability to maintain acceptable service ratios and response times

5.12.2 No-Action Alternative

Under the No-Action Alternative, construction of the Segment 3C Phase 2 components is not expected to affect public services because construction would be confined to a small segment of the river. No other activities that would affect public services would occur under the No-Action Alternative.

Determination: The No-Action Alternative would have no adverse effect on public services because construction will be confined to a small segment of the river.

5.12.3 Bypass System Alternative

Construction associated with the Bypass System Alternative has the potential to result in the temporary disruption of public services, including water, wastewater, gas, electricity, telephone, and cable television. Construction would not require new wastewater treatment facilities, would not require new or expanded stormwater facilities, and would not involve consumptive use of water. Removal of the St. John Street and Old Julian Street Bridges and construction in the river channel could temporarily interrupt gas, electricity, telephone, and cable television services. However, the service providers would be contacted in advance so that they can reroute services or notify their customers of impending service interruptions. In addition, disruptions are expected to be short-term and temporary.

The Bypass System Alternative would not affect the provision of or need for governmental facilities or the ability to maintain acceptable service ratios; its primary effect on fire, police, and other emergency services would be that emergency vehicles could no longer use the St. John Street Bridge. However, this would not affect emergency service response times because emergency vehicles regularly use other main arterial routes, such as West Santa Clara Street and New Julian Street. Temporary lane closures during construction are also not expected to increase response times because emergency vehicles will still be able to use these routes.

Determination: The Bypass System Alternative would have a less-than-significant adverse effect on public services because:

- Construction would not require additional services
- Interruptions in service would be temporary
- Service providers would be notified in advance
- Temporary lane closures would not affect emergency services

5.12.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection improvements that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The Refined Bypass System Alternative would result in effects on public services identical to those described for the Bypass System Alternative.

Determination: The Refined Bypass System Alternative would have a less-than-significant effect on public services for the same reasons listed under the Bypass System Alternative.

5.13 Hazards and Hazardous Materials

5.13.1 Criteria for Determining Significance of Effects

The following criteria were used to determine the significance of effects related to hazards and hazardous materials. These criteria are based on the CEQA Guidelines and CEQ's NEPA regulations. The Guadalupe River Project would have a significant effect if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- Create a significant hazard to the public or the environment through reasonable foreseeable upset or accident conditions involving the release of hazardous materials into the environment
- Impair implementation of an emergency response plan
- Expose the public, workers, or the environment to hazardous materials

5.13.2 No-Action Alternative

Under the No-Action Alternative, previously identified contaminated soils and sediments in the area around Segments 3A and 3B would be remediated by the current property owners to San Francisco Bay RWQCB standards. No hazards or hazardous materials were identified in Segment 3C Phase 2.

Determination: The No-Action Alternative would have no adverse hazards or hazardous materials effects.

5.13.3 Bypass System Alternative

Site excavation and grading required by the implementation of the Bypass System Alternative in Segments 3A and 3B are not expected to have the potential to expose workers to contaminants in the soil and to disperse contaminants into the surrounding environment because the Sobrato property, Perez property, and the UPRR site will be cleaned prior to construction. An independent certified industrial hygienist would provide a memorandum to SCVWD stating that worker protection is Level D or less before construction would begin at the UPRR site (Nguyen, pers. comm.).

During construction of the bypass, water would accumulate in the below-grade construction area and would be pumped to settling tanks and tested for toxic constituents. If the water is clean, it would be pumped into the river in accordance with San Francisco Bay RWQCB regulations. A contingency plan will be in place for unknown sites.

The Hazardous and Toxic Materials Contingency Plan, as described in Section 3.4.3, "Environmental Commitments," will address the construction protocol in cases where unknown hazardous materials sites are uncovered. This contingency plan will outline the immediate course of action, including an immediate work stoppage, to follow if HTRWs are uncovered. Once the uncovered site is delineated and characterized, if required, a cleanup plan similar to those implemented for the cleanup of identified sites will be implemented and the site will be remediated to levels at the least protective of construction workers wearing Level D personal protective equipment.

The use of construction equipment could result in the release of diesel fuel or vehicle lubricants to the environment. Measures described in the SWPPP and in Section 3.4.4, "Environmental Commitments," are designed to ensure that contaminants from construction equipment would be properly handled during project construction.

Once construction of the Bypass System Alternative has been completed, neither exposure of workers, the public, nor the environment to hazardous materials nor generation of hazardous materials is expected.

Determination: The Bypass System Alternative would have less-than-significant hazards or hazardous materials effects because:

- Construction areas are already clean or on sites awaiting remediation would be cleaned
- Water would be tested before being released into the river
- Appropriate actions would be taken if additional hazardous materials sites are discovered during construction.

5.13.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The potential to expose workers to hazards and hazardous materials during construction of the Refined Bypass System Alternative would be the same as described for the Bypass System Alternative because the same amount of material would be excavated for the bypass.

The potential for spills of fuels and lubricants into the Guadalupe River would be slightly less than under the Bypass System Alternative because heavy equipment would no longer be necessary to construct the bank armoring near the New Julian Street Bridge.

Determination: The Refined Bypass System Alternative would have less-than-significant hazards or hazardous materials effects for the same reasons listed under the Bypass System Alternative.

5.14 Cultural Resources

5.14.1 Criteria for Determining Significance of Effects

The following criteria were used to determine the significance of effects on cultural resources. These criteria are based on NEPA, CEQA, and additional Federal and State guidelines with regard to the identification of cultural resources. The Guadalupe River Project would have a significant effect on cultural resources if it would alter those characteristics of a historic property that might qualify the property for inclusion in the NRHP. Federal guidelines define a significant historical resource as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP (36 CFR 800.2). Adverse effects on historic properties include but are not limited to:

- Physical destruction or alteration of all or part of the property
- Isolation of the property from or alteration of the property's setting, when that character contributes to the property's qualifications for listing in the NRHP
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting
- Neglect of a property, resulting in its deterioration or destruction, or
- Transfer, lease, or sale of the property (36 CFR 800.9.).

CEQA states that public or private projects financed or approved by public agencies must assess the project's effects on cultural resources. CEQA requires that if a project would result in a significant effect on an important cultural resource, alternative plans or mitigation measures must be considered; however, only important cultural resources must be addressed. Therefore, the importance of cultural resources must be assessed prior to the development of mitigation measures. The steps that are normally taken in a cultural resources investigation for CEQA compliance are to (1) determine whether cultural resources are present at a project site, (2) evaluate the significance of any resources

identified, and (3) develop and implement measures to mitigate the project's effects on resources that are determined to be important.

5.14.2 No-Action Alternative

Under the No-Action Alternative, construction of the Segment 3C Phase 2 components is not expected to affect cultural resources. The potential for effects on cultural resources resulting from this construction was evaluated by the Corps in previous environmental documents (U.S. Army Corps of Engineers, 1985). No other ground-disturbing activities would occur under the No-Action Alternative that would affect cultural resources.

Determination: The No-Action Alternative would have no adverse effect on cultural resources.

5.14.3 Bypass System Alternative

Surveys of the Guadalupe River Project area have determined that construction of the Bypass System Alternative and operation of the Guadalupe River Project with Bypass System Alternative would not affect any known prehistoric or historic resources. These surveys also indicate that the probability is low that previously unidentified cultural resources would be found on or near the ground surface. However, if a prehistoric or historic site is discovered during project construction, the Corps and SCVWD will implement the mitigation measures described in the following paragraphs.

If a prehistoric archeological site is discovered, the site will be evaluated for significance under the criteria for the NRHP. A Native American monitor will be present during the evaluation of the site's significance. If human remains of Native American origin are discovered during project construction, procedures identified in the California public health and safety codes would be followed. These procedures include notifying the County Coroner and the Native American Heritage Commission. The Native American Heritage Commission would appoint a "most likely descendant" to make recommendations regarding the treatment of the remains.

If a prehistoric or historic site is discovered and appears to be potentially eligible for NRHP listing, procedures stipulated under implementing regulations for the NHPA (36 CFR 800) would be followed. These procedures include consulting with the SHPO to confirm eligibility of the site(s) for the NRHP and development of a Memorandum of Agreement that specifies treatment of the site(s). Treatment could consist of data recovery; site avoidance; or, possibly, capping the site to avoid further effects.

Determination: The Bypass System Alternative would have no adverse effect on cultural resources because construction activities are not expected to affect any known cultural resources and, if cultural resources are discovered, measures would be implemented to avoid effects.

5.14.4 Refined Bypass System Alternative

The Refined Bypass System Alternative includes all the flood protection components that would be constructed as part of the Bypass System Alternative except for 200 feet of armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge. The potential effects to cultural resources under the Refined Bypass System

Alternative would be nearly the same as described for the Bypass System Alternative. The potential effects to unknown cultural resources could be slightly reduced because there would be slightly less ground-disturbing activity. If a prehistoric or historic resource is discovered during construction, the procedures to protect significant sites described under the Bypass System Alternative would be followed.

Determination: The Refined Bypass System Alternative would have no adverse effect on cultural resources for the same reasons listed under the Bypass System Alternative.

5.15 Summary of Environmental Effects

Table 5.15-1 summarizes the environmental effects expected to occur under the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative. It includes the effects analyzed and mitigation described in the preceding sections of this chapter.

5.16 Analysis of an Additional Alternative Considered for CEQA Purposes

For the purposes of CEQA compliance, Corps and SCVWD have determined that an additional alternative will be considered which would avoid or substantially lessen the significant effects of the Refined Bypass System Alternative. The Extended Bypass Alternative is considered in this section for comparison purposes because, consistent with CEQA, it would result in less adverse environmental effects than the Refined Bypass System Alternative.

This section estimates the effects that would occur with implementation of the Extended Bypass Alternative. Quantitative differences are provided where possible, but the analysis primarily consists of a qualitative comparison to the Refined Bypass System Alternative. The Extended Bypass Alternative is described in detail in Chapter 3, "Alternatives, Including the Refined Bypass System Alternative."

TABLE 5.15-1. Summary of Environmental Effects and Determination of Significance

Summary of potential environmental effects under the Bypass System Alternative, the Refined Bypass System Alternative, the No-Action Alternative, and the potential level of significance before and after environmental commitments/mitigation. Chapter 5 provides specific details on implementation and objectives of the environmental commitments/mitigation.

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
5.1 HYDROLOGY AND HYDRAULICS			
Flooding			
Effect:	Reduce the frequency and severity of flooding in downtown San Jose and contain the 100-year design floodflow.	Reduce the frequency and severity of flooding in downtown San Jose and contain the 100-year design floodflow.	No change from existing conditions. Floodwaters would continue to overbank and bridges could be damaged during the 100-year design floodflow.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Beneficial effect.	Beneficial effect.	Continued significant adverse effect.
determination with mitigation:	Beneficial effect.	Beneficial effect.	Continued significant adverse effect.
Flow Velocity			
Effect:	Decreased in-channel flow velocities, except in armored sections of the river. Bypass flow velocities would exceed in-channel velocities when flows are equal to or greater than 9,200 cfs (20-year floodf low).	Decreased in-channel flow velocities, except in armored sections of the river. Bypass flow velocities would exceed in-channel velocities when flows are equal to or greater than 9,200 cfs (20-year floodflow).	No change from existing conditions.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect, also see 5.2 and 5.6.	Less-than-significant adverse effect, also see 5.2 and 5.6.	No effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
5.2 RIVER GEOMORPHOLOGY			
Channel Erosion and Deposition			
Effect:	Potential for operation to increase washload transport and erosion and deposition in Segments 3A and 3B.	Potential for operation to increase washload transport and erosion and deposition in Segments 3A and 3B.	Not applicable.
mitigation:	Channel erosion would be monitored annually for bank stability and channel bed stability. Invert stabilization structures in Segments 3A and 3B will minimize effects on stability.	Channel erosion would be monitored annually for bank stability and channel bed stability. Invert stabilization structures in Segments 3A and 3B will minimize effects on stability.	Not applicable.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
Effect:	Potential for the Guadalupe River Project with Bypass System Alternative to increase channel erosion downstream from the bypass system in Segments 1 and 2.	Potential for the Guadalupe River Project with Refined Bypass System Alternative to increase channel erosion downstream from the bypass system in Segments 1 and 2.	No change from existing conditions. The existing sediment transport and deposition properties, and the existing channel erosion processes of the Guadalupe River would continue.
mitigation:	Channel erosion would be monitored annually for bank stability and channel bed stability.	Channel erosion would be monitored annually for bank stability and channel bed stability.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
River Morphology			
Effect:	Guadalupe River Project with Bypass System Alternative would cause localized changes in channel form and the riffle/run/pool complex, but would not change downstream sediment delivery or river morphology.	Guadalupe River Project with Refined Bypass System Alternative would cause localized changes in channel form and the riffle/run/pool complex, but would not change downstream sediment delivery or river morphology.	The No-Action Alternative would have little or no effect on overall river geomorphology, including riffle/run/pool ratios.
mitigation:	No mitigation required.	No mitigation required.	The armored channel bed in Segment 3C will contain a trapezoid/boulder low-flow channel designed to include pool and riffle features.
determination without mitigation:	No effect.	No effect.	Less-than-significant adverse effect.
determination with mitigation:	No effect.	No effect.	Less-than-significant adverse effect.
Effect:	Increase in pools in Segments 1 and 2.	Increase in pools in Segments 1 and 2.	Not applicable.
mitigation:	No mitigation required.	No mitigation required.	Not applicable.
determination without mitigation:	Less-than-significant effect.	Less-than-significant effect.	Not applicable.
determination with mitigation:	Less-than-significant effect.	Less-than-significant effect.	Not applicable.
Effect:	Operation of the bypass system would have little or no effect on ongoing river geomorphology, including riffle/run/pool formation.	Operation of the bypass system would have little or no effect on ongoing river geomorphology, including riffle/run/pool formation.	Not applicable.
mitigation:	No mitigation required.	No mitigation required.	Not applicable.
determination without mitigation:	No effect.	No effect.	Not applicable.
determination with mitigation:	No effect.	No effect.	Not applicable.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
5.3 WATER QUALITY			
Suspended Solids and Biostimulatory Nutrients			
Effect:	Potential for construction to increase concentrations of suspended solids and biostimulatory nutrients.	Potential for construction to increase concentrations of suspended solids and biostimulatory nutrients.	Potential for construction to increase concentrations of suspended solids and biostimulatory nutrients.
mitigation:	Effects would be avoided through the implementation of an SWPPP, spill prevention and response plan, erosion and sediment control plan, and other prevention measures required by CDFG.	Effects would be avoided through the implementation of an SWPPP, spill prevention and response plan, erosion and sediment control plan, and other prevention measures required by CDFG.	Effects would be avoided through the implementation of an SWPPP, spill prevention and response plan, erosion and sediment control plan, and other prevention measures required by CDFG.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Significant adverse effect.
determination with mitigation:	No effect.	No effect.	Less-than-significant adverse effect.
Effect:	Potential for operation of the bypasses to transport suspended sediments.	Potential for operation of the bypasses to transport suspended sediments.	Not applicable.
mitigation:	No mitigation required.	No mitigation required.	Not applicable.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
Effect:	The Guadalupe River Project with Bypass System Alternative is not expected to require channel maintenance activities different than those currently being conducted in the project area.	The Guadalupe River Project with Refined Bypass System Alternative is not expected to require channel maintenance activities different than those currently being conducted in the project area.	No change from existing conditions.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Toxic Constituents – Accidental Spills of Construction Materials			
Effect:	Potential to result in accidental spills during construction.	Potential to result in accidental spills during construction.	Potential to result in accidental spills during construction.
mitigation:	Effects would be avoided through the implementation of a spill prevention and response plan.	Effects would be avoided through the implementation of a spill prevention and response plan.	Effects would be avoided through the implementation of a spill prevention and response plan.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	No effect.	No effect.	No effect.
Toxic Constituents – Mercury			
Effect:	Potential for increased transport of mercury during construction and operation.	Potential for increased transport of mercury during construction and operation.	Potential for increased transport of mercury during construction and maintenance.
mitigation:	Effects would be avoided through the implementation of an Erosion and Sediment Control Plan and a soil management plan that includes sampling and contaminated soil removal.	Effects would be avoided through the implementation of an Erosion and Sediment Control Plan and a soil management plan that includes sampling and contaminated soil removal.	Effects would be avoided through the implementation of an Erosion and Sediment Control Plan and a soil management plan that includes sampling and contaminated soil removal.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Effect:	Potential for increased methyl mercury formation during construction and operation.	Potential for increased methyl mercury formation during construction and operation.	Potential for increased methyl mercury formation during construction and operation.
mitigation:	Effects would be avoided through Project design.	Effects would be avoided through Project design.	Effects would be avoided through Project design.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Temperature			
Effect:	The Guadalupe River Project with Bypass System Alternative would result in temperature increases.	The Guadalupe River Project with Refined Bypass System Alternative would result in temperature increases.	The No-Action Alternative would result in increases in water temperature, though the increases would be substantially less than under the Guadalupe River Project with Bypass System Alternative because less SRA cover vegetation would be affected.
mitigation:	The quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program, which includes 18,026 lf of SRA, cover vegetation.	The quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program, which includes 18,026 lf of SRA, cover vegetation.	The quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Dissolved Oxygen			
Effect:	Temperature effects are not expected to result in an appreciable reduction in dissolved oxygen concentrations in the Guadalupe River.	Temperature effects are not expected to result in an appreciable reduction of dissolved oxygen concentrations in the Guadalupe River.	Dissolved oxygen concentrations would be similar to existing conditions.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
5.4 BIOLOGICAL RESOURCES – VEGETATION			
Riparian Vegetation			
Effect:	Direct loss of 5.76 acres of riparian vegetation from construction of the Bypass System Alternative. (The entire Guadalupe River Project with Bypass System Alternative would effect 14.12 acres.).	Direct loss of 5.41 acres of riparian vegetation. (Construction of the Guadalupe River Project with Refined Bypass System would effect 13.77 acres.).	Direct loss of 8.36 acres of riparian vegetation from construction of the No-Action Alternative.
mitigation:	Planting of 21.0 acres of riparian vegetation with monitoring and remedial actions described in the MMP mitigates for the effects of the Bypass System Alternative and the Guadalupe River Project with Bypass System Alternative. The vegetation protection plan and mitigation site protection plan would ensure that additional effects are avoided.	Planting of 21.0 acres of riparian vegetation with monitoring and remedial actions described in the MMP mitigates for the effects of the Refined Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative. The vegetation protection plan and mitigation site protection plan would ensure that additional effects are avoided.	The planting of 21.0 acres of riparian vegetation has mitigated for these effects.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
SRA Cover Vegetation			
Effect:	Direct loss of 3,861 lf of SRA cover vegetation. (Construction of the entire Guadalupe River Project with Bypass System Alternative would effect 8,387 lf of SRA cover vegetation.).	Direct loss of 3,789 lf of SRA cover vegetation. (Construction of the entire Guadalupe River Project with Refined Bypass System Alternative would effect 8,315 lf of SRA cover vegetation.).	Direct loss of 4,526 lf of SRA cover vegetation.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
mitigation:	The quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program, which includes 18,026 lf of SRA, cover vegetation, and monitoring and remedial actions.	The quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program, which includes 18,026 lf of SRA, cover vegetation, and monitoring and remedial actions.	The quantity and quality of SRA cover vegetation will be fully replaced by the proposed mitigation planting program. A total of 4,705 lf of SRA cover vegetation has been planted as compensation for the previous loss. Additionally, a HEP analysis would be conducted to determine the need for additional plantings.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Wetlands			
Effect:	No wetland habitat is present in Segments 3A and 3B, and installation of SRA cover vegetation mitigation plantings in Reach A would not effect wetlands.	No wetland habitat is present in Segments 3A and 3B, and installation of SRA cover vegetation mitigation plantings in Reach A would not effect wetlands.	No wetlands were identified in Segments 1, 2, and 3C Phases 1 and 2.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
Effect:	Implementation of the Guadalupe River Project with Bypass System Alternative is not expected to require channel maintenance activities different than those currently conducted in the project area. Current routine channel maintenance does not affect wetlands in the downtown reach because no wetlands exist in that area.	Implementation of the Guadalupe River Project with Refined Bypass System Alternative is not expected to require channel maintenance activities different than those currently conducted in the project area. Current routine channel maintenance does not affect wetlands in the downtown reach because no wetlands exist in that area.	Current routine channel maintenance does not affect wetlands in Segments 1 and 2 or 3C Phase 1 and 2 because no wetlands exist in that area.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
Effect:	Temporary effect on 3.8 acres of other waters of the United States in Segments 3A and 3B. SRA cover vegetation mitigation plantings in Reach A would not effect waters of the United States.	Temporary effect on 3.8 acres of other waters of the United States in Segments 3A and 3B. SRA cover vegetation mitigation plantings in Reach A would not effect waters of the United States.	Temporary effect in Segment 3C Phase 2 on 1.6 acres of other waters of the United States.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Upland Vegetation			
Effect:	No upland vegetation has been identified in Segments 3A and 3B. No loss of ruderal scrub or herbaceous habitat in Reach A.	No upland vegetation has been identified in Segments 3A and 3B. No loss of ruderal scrub or herbaceous habitat in Reach A.	No upland vegetation was identified in Segments 1, 2, and 3C Phases 1 and 2. No loss of ruderal scrub or herbaceous habitat in Reach A.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
Special-Status Plants			
Effect:	No plants that are State- or federally listed, or proposed for listing, as threatened or endangered have been observed or are considered likely to be found in the project area.	No plants that are State- or federally listed, or proposed for listing, as threatened or endangered have been observed or are considered likely to be found in the project area.	No plants that are State- or federally listed, or proposed for listing, as threatened or endangered have been observed or are considered likely to be found in the project area.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
5.5 BIOLOGICAL RESOURCES – WILDLIFE			
Riparian and Wetland Species			
Effect:	Loss of 5.76 acres of riparian wildlife habitat and 3,861 lf of SRA cover habitat, including riverbank and channel bed armoring. (The entire Guadalupe River Project with Refined Bypass System Alternative would effect 13.77 acres of riparian wildlife habitat and 8,387 lf of SRA cover habitat.).	Loss of 5.41 acres of riparian wildlife habitat and 3,789 lf of SRA cover vegetation habitat, including riverbank and channel bed armoring. (The entire Guadalupe River Project with Refined Bypass System Alternative would effect 13.77 acres of riparian wildlife habitat and 8,315 lf of SRA cover habitat.).	Loss of 8.36 acres of riparian wildlife habitat and 4,526 lf of SRA cover vegetation wildlife habitat.
mitigation:	The planting of 21.0 acres of riparian vegetation and 18,026 lf of SRA cover vegetation, including monitoring and remedial actions will ensure that the proposed mitigation planting program would compensate for effects to wildlife habitat quality and value.	The planting of 21.0 acres of riparian vegetation and 18,026 lf of SRA cover vegetation, including monitoring and remedial actions will ensure that the proposed mitigation planting program would compensate for effects to wildlife habitat quality and value.	The planting of 21.0 acres of riparian vegetation and 4,705 lf of SRA cover vegetation has likely mitigated for these effects, but a new HEP analysis for SRA cover vegetation would be conducted to determine whether additional mitigation would be needed.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Effect:	Recreational near the riparian corridor and mitigation sites is not expected to adversely affect wildlife because recreational trails would be located outside the riparian areas.	Recreational near the riparian corridor and mitigation sites is not expected to adversely affect wildlife because recreational trails would be located outside the riparian areas.	Recreational near the riparian corridor and mitigation sites is not expected to adversely affect wildlife because recreational trails would be located outside the riparian areas.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Special-Status Wildlife Species			
Effect:	No State- or federally listed wildlife species are known to occur in the study area. Suitable habitat is not present or is of low quality.	No State- or federally listed wildlife species are known to occur in the study area. Suitable habitat is not present or is of low quality.	No State- or federally listed wildlife species are known to occur in the study area.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
5.6 BIOLOGICAL RESOURCES – FISH			
Adult and Juvenile Anadromous Fish Migration – Hydrologic and Hydraulic Conditions			
Effect:	Potential for stranding anadromous.	Potential for stranding anadromous fish.	Potential for stranding anadromous.
mitigation:	Design of the bypasses would prevent pooling of water and would drain such that fish entrapment does not occur.	Design of the bypasses would prevent pooling of water and would drain such that fish entrapment does not occur.	Secondary channel designs would maintain a connection sufficient to enable fish to return to the main river channel.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Effect:	Bypasses have the potential to attract anadromous fish because of greater flows. Fish migrating in the bypasses may expend additional energy.	Bypasses have the potential to attract anadromous fish because of greater flows. Fish migrating in the bypasses may expend additional energy.	Not applicable.
mitigation:	Design of the bypass system allows greater flows very infrequently and for a very short duration.	Design of the bypass system allows greater flows very infrequently and for a very short duration.	Not applicable.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Effect:	Potential to increase water velocities in the natural channel that exceed the ability of migrating fish to swim upstream.	Potential to increase water velocities in the natural channel that exceed the ability of migrating fish to swim upstream.	Not applicable.
mitigation:	No mitigation required.	No mitigation required.	Not applicable.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
Effect:	2,635 lf of channel bed armoring could create depth and velocity conditions that could impede migration of adult and juvenile anadromous fish.	2,635 lf of channel bed armoring could create depth and velocity conditions that could impede migration of adult and juvenile anadromous fish.	1,045 lf of channel bed armoring could create depth and velocity conditions that could impede migration of adult and juvenile anadromous fish.
mitigation:	Design includes a low-flow channel in the sections of the river where there would be armored channel bed.	Design includes a low-flow channel in the sections of the river where there would be armored channel bed.	Design includes a trapezoidal/boulder low-flow channel in the section of the river where there would be armored channel bed.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Adult and Juvenile Anadromous Fish Migration – Channel Erosion and Deposition			
Effect:	Potential to reduced riffle depth and increase velocities that could inhibit upstream migration of anadromous fish.	Potential to result in reduced riffle depth and increased velocities that could inhibit upstream migration of anadromous fish.	Increased erosion and deposition of channel-bottom soil could reduce riffle depth or increase flow velocity, restricting fish migration. However, channel maintenance flows would remain.
mitigation:	Maintaining channel maintenance flows in the Guadalupe River would minimize effects. Invert stabilization structures would be installed to maintain sediments and pools. Additionally, effects would be monitored annually and compensated for, if necessary, in accordance with the Mitigation and Monitoring Plan.	Maintaining channel maintenance flows in the Guadalupe River would minimize effects. Invert stabilization structures would be installed to maintain sediments and pools. Additionally, effects would be monitored annually and compensated for, if necessary, in accordance with the Mitigation and Monitoring Plan.	Effects would be monitored annually and compensated for, if necessary, in accordance with the Mitigation and Monitoring Plan.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Adult and Juvenile Anadromous Fish Migration – River Morphology			
Effect:	Potential impediment of fish passage in armored sections of the channel.	Potential impediment of fish passage in armored sections of the channel.	Potential impediment of fish passage in armored sections of the channel.
mitigation:	Installation of trapezoidal/boulder low-flow channel in Segments 3A and 3B.	Installation of trapezoidal/boulder low-flow channel in Segments 3A and 3B.	Installation of trapezoidal/boulder low-flow channel in Segment 3C; low-flow channels have already been installed under I-880 and Coleman Avenue.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
Effect:	Removal of barriers would improve conditions for migration of adult and juvenile anadromous fish.	Removal of barriers would improve conditions for migration of adult and juvenile anadromous fish.	Existing barriers would remain in place.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Beneficial effect.	Beneficial effect.	No effect.
determination with mitigation:	Beneficial effect.	Beneficial effect.	No effect.
Adult and Juvenile Anadromous Fish Migration – Suspended Solids and Toxic Constituents			
Effect:	Potential for accidental spills that could affect migrating fish.	Potential for accidental spills that could affect migrating fish.	Potential for accidental spills that could affect migrating fish.
mitigation:	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and spill prevention and response plan. No construction would occur during the migration period.	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and spill prevention and response plan. No construction would occur during the migration period.	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and spill prevention and response plan. No construction would occur during the migration period.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	No effect.	No effect.	No effect.
Adult and Juvenile Anadromous Fish Migration – Water Temperature			
Effect:	Postproject and postmitigation water temperatures from November through February, when the migration of anadromous fish reaches its peak, would be similar to those under existing conditions.	Postproject and postmitigation water temperatures from November through February, when the migration of anadromous fish reaches its peak, would be similar to those under existing conditions.	Postproject and postmitigation water temperatures from November through February, when the migration of anadromous fish reaches its peak, would be similar to those under existing conditions.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
Adult and Juvenile Anadromous Fish Migration – Shaded Riverine Aquatic Cover			
Effect:	Loss of 3,861 lf of SRA cover vegetation that provides resting areas and refuge from predators for migrating anadromous fish.	Loss of 3,798 lf of SRA cover vegetation that provides resting areas and refuge from predators for migrating anadromous fish.	Loss of 4,526 lf of SRA cover vegetation that provides resting areas and refuge from predators for migrating anadromous fish.
mitigation:	SRA cover vegetation would be planted to reestablish resting areas and provide refuge from predators. Biotechnical features such as logs and root wads, and boulders placed in the constructed low-flow channel would also provide instream cover.	SRA cover vegetation would be planted to reestablish resting areas and provide refuge from predators. Biotechnical features such as logs and root wads, and boulders placed in the constructed low-flow channel would also provide instream cover.	SRA cover vegetation would be planted to reestablish resting areas and provide refuge from predators. Biotechnical features such as logs and root wads, and boulders placed in the constructed low-flow channel would also provide instream cover.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Anadromous Fish Spawning and Incubation – Hydrologic and Hydraulic Conditions			
Effect:	Adequate spawning depths and velocities in the natural channel when the bypass contains floodflows.	Adequate spawning depths in the natural channel when the bypass contains floodflows.	Adequate spawning depth would be maintained in the natural channel when secondary channel contains floodflows.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
Anadromous Fish Spawning and Incubation – Channel Erosion and Deposition			
Effect:	Alteration of channel form.	Alteration of channel form.	Alteration of channel form.
mitigation:	Riverbank and channel bed stability will be monitored annually to verify that adverse effects remain less than significant.	Riverbank and channel bed stability will be monitored annually to verify that adverse effects remain less than significant.	Riverbank and channel bed stability will be monitored annually to verify that adverse effects remain less than significant.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect	Less-than-significant adverse effect.
Anadromous Fish Spawning and Incubation – River Morphology			
Effect:	Removal of 11,200 sf of spawning gravel reduces spawning habitat for resident and anadromous fish.	Removal of 11,200 sf of spawning gravel reduces spawning habitat for resident and anadromous fish.	Removal of 720 sf of gravel reduces spawning habitat for resident and anadromous fish.
mitigation:	Replace and maintain up to 25,190 sf of river-run gravel in the downtown reach. Spawning gravel would be monitored and replaced as necessary with gravel of similar quantity and quality.	Replace and maintain up to 25,190 sf of river-run gravel in the downtown reach. Spawning gravel would be monitored and replaced as necessary with gravel of similar quantity and quality.	Replace and maintain up to 5,090 sf of river-run gravel in the downtown reach. Spawning gravel would be monitored and replaced as necessary with gravel of similar quantity and quality.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Anadromous Fish Spawning and Incubation – Suspended Solids and Toxic Constituents			
Effect:	Potential water quality effects from accidental spills that could affect anadromous fish eggs, larvae, or spawning success.	Potential water quality effects from accidental spills that could affect anadromous fish eggs, larvae, or spawning success.	Potential water quality effects from accidental spills that could affect anadromous fish eggs, larvae, or spawning success.
mitigation:	Effects would be avoided by implementation of an SWPPP, complying with a streambed alteration agreement, and limiting in-channel construction to outside the spawning season.	Effects would be avoided by implementation of an SWPPP, complying with a streambed alteration agreement, and limiting in-channel construction to outside the spawning season.	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and spill prevention and response plan.
determination without mitigation:	Potentially significant adverse effect.	Potentially significant adverse effect.	Potentially significant adverse effect.
determination with mitigation:	No effect.	No effect.	No effect.
Anadromous Fish Spawning and Incubation – Water Temperature			
Effect:	Slight change in water temperatures in months when anadromous fish are spawning and eggs are incubating.	Slight change in water temperatures in months when anadromous fish are spawning and eggs are incubating.	Slight change in water temperatures in months when anadromous fish are spawning and eggs are incubating.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Resident and Anadromous Fish Rearing – Hydrologic and Hydraulic Conditions			
Effect:	The frequency, duration, and magnitude of the bypass diversions would not affect flows less than 1,500 cfs.	The frequency, duration, and magnitude of the bypass diversions would not affect flows less than 1,500 cfs.	Woz Way to Park Avenue Bypass nonoperational. No bypass construction in Segments 3A and 3B.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Effect:	Secondary channel provides rearing habitat when flows exceed 300 cfs.	Secondary channel provides rearing habitat when flows exceed 300 cfs.	Secondary channel provides rearing habitat when flows exceed 300 cfs.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Beneficial effect.	Beneficial effect.	Beneficial effect.
determination with mitigation:	Beneficial effect.	Beneficial effect.	Beneficial effect.
Resident and Anadromous Fish Rearing – Channel Erosion and Deposition			
Effect:	Channel bed erosion and deposition could occur near the bypass intakes and discharges reducing rearing habitat.	Channel bed erosion and deposition could occur near the bypass intakes and discharges reducing rearing habitat.	Channel bed erosion and deposition could occur near the bypass intakes and discharges reducing rearing habitat.
mitigation:	Riverbank and channel bed stability and spawning gravels would be monitored annually and compensated for, if necessary, in accordance with the Mitigation and Monitoring Plan.	Riverbank and channel bed stability and spawning gravels would be monitored annually and compensated for, if necessary, in accordance with the Mitigation and Monitoring Plan.	Riverbank and channel bed stability and spawning gravels would be monitored annually and compensated for, if necessary, in accordance with the Mitigation and Monitoring Plan.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Resident and Anadromous Fish Rearing – River Morphology			
Effect:	Loss of pools in Segments 3A and 3B, reducing rearing habitat for resident and anadromous fish.	Loss of pools in Segments 3A and 3B, reducing rearing habitat for resident and anadromous fish.	Loss of pools in Segment 3C, reducing rearing habitat for resident and anadromous fish.
mitigation:	The low-flow channel, invert stabilization structures in the natural riverbed, and SRA cover vegetation mitigation will provide rearing habitat diversity.	The low-flow channel, invert stabilization structures in the natural riverbed, and SRA cover vegetation mitigation will provide rearing habitat diversity.	The low-flow channels in Segments 1 and 2, and trapezoid/boulder low-flow channel in Segment 3C Phase 2 will provide rearing habitat diversity.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Resident and Anadromous Fish Rearing – Suspended Solids and Toxic Constituents			
Effect:	Potential accidental spills that could increase suspended solids and toxic constituents that could affect rearing of anadromous fish.	Potential accidental spills that could increase suspended solids and toxic constituents that could affect rearing of anadromous fish.	Potential accidental spills could increase suspended solids and toxic.
mitigation:	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and spill prevention and response plan.	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and a spill prevention and response plan.	Effects would be avoided by implementing an SWPPP, streambed alteration agreement, erosion and sediment control plan, and spill prevention and response plan.
determination without mitigation:	Potential significant adverse effect.	Potential significant adverse effect.	Potential significant adverse effect.
determination with mitigation:	No effect.	No effect.	No effect.
Resident and Anadromous Fish Rearing – Water Temperature			
Effect:	Increased water temperatures during the rearing season for chinook salmon and steelhead.	Increased water temperatures during the rearing season for chinook salmon and steelhead.	Increased water temperatures during the rearing season for chinook salmon and steelhead would be less than the increase modeled for the Guadalupe River Project with Bypass System Alternative.
mitigation:	The Corps and SCVWD have committed to planting SRA cover vegetation and monitoring water temperatures to ensure that water temperatures are suitable for juvenile survival. Postmitigation water temperatures are expected to be lower than postproject temperatures because of the cooling provided by SRA cover vegetation.	The Corps and SCVWD have committed to planting SRA cover vegetation and monitoring water temperatures to ensure that water temperatures are suitable for juvenile survival. Postmitigation water temperatures are expected to be lower than postproject temperatures because of the cooling provided by SRA cover vegetation.	No mitigation required. However, monitoring of water temperature, along with observing juvenile steelhead occurrence, would verify whether this effect remains less than significant.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Resident and Anadromous Fish Rearing – Shaded Riverine Aquatic Cover			
Effect:	Loss of 3,861 lf of SRA cover vegetation that provides rearing habitat.	Loss of 3,789 lf of SRA cover vegetation that provides rearing habitat.	Loss of 4,526 lf of SRA cover vegetation and instream cover.
mitigation:	SRA cover vegetation would be planted to reestablish resting areas and provide refuge from predators. Biotechnical features such as logs and root wads, and boulders placed in the constructed low-flow channel would also provide instream cover.	SRA cover vegetation would be planted to reestablish resting areas and provide refuge from predators. Biotechnical features such as logs and root wads, and boulders placed in the constructed low-flow channel would also provide instream cover.	Planting of SRA cover vegetation would fully mitigate for the loss of SRA cover vegetation. Biotechnical features such as logs and root wads, and boulders placed in the constructed low-flow channel would also provide instream cover.
determination without mitigation:	Significant adverse effect.	Significant adverse effect.	Significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
5.7 LAND USE AND PLANNING			
Effect:	No conflict with existing land uses or the City of San Jose General Plan or the Guadalupe River Park Master Plan.	No conflict with existing land uses or the City of San Jose General Plan or the Guadalupe River Park Master Plan.	No conflict with existing land.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
5.8 RECREATION, PUBLIC ACCESS, AND VISUAL RESOURCES			
Recreation			
Effect:	Potential temporary disruption of river-related recreational activities during construction.	Potential temporary disruption of river-related recreational activities during construction.	Temporary disruption of river-related recreation activities during construction.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Effect:	Enhanced public access and recreation opportunities.	Enhanced public access and recreation opportunities.	No trails would be constructed in Segments 3A and 3B.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Beneficial effect.	Beneficial effect.	No effect.
determination with mitigation:	Beneficial effect.	Beneficial effect.	No effect.
Effect:	Potential temporary disruption of river-related recreational activities during maintenance.	Potential temporary disruption of river-related recreational activities during maintenance.	Potential temporary disruption of river-related recreational activities during maintenance.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Boating			
Effect:	Potential alteration of boating opportunities on the Guadalupe River.	Potential alteration of boating opportunities on the Guadalupe River.	No change from existing conditions.
mitigation:	Design of the invert stabilization structures accommodates the passage of watercraft and safety precautions would be implemented to warn boaters of the risk of entering the bypass.	Design of the invert stabilization structures accommodates the passage of watercraft and safety precautions would be implemented to warn boaters of the risk of entering the bypass.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
Visual/Aesthetic Resources			
Effect:	The armoring of Segment 3A and 3B would result in visual changes, but not in substantial damage to, degradation of, or glare on existing scenic resources.	The armoring of Segment 3A and 3B would result in visual changes, but not in substantial damage to, degradation of, or glare on existing scenic resources.	The armoring of Segment 3C would result in visual changes, but not in substantial damage to, degradation of, or glare on scenic resources.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Consistency with Plans and Policies			
Effect:	Consistent with existing land use plans and policies.	Consistent with existing land use plans and policies.	Consistent with existing land use plans and policies.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
5.9 TRANSPORTATION AND TRAFFIC			
Roadway Capacity			
Effect:	Change in roadway capacity below the threshold of 100 peak-hour vehicle trips per day.	Change in roadway capacity below the threshold of 100 peak-hour vehicle trips per day.	Change in roadway capacity below the threshold of 100 peak-hour vehicle trips per day.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Traffic Circulation			
Effect:	Short-term alteration of traffic circulation patterns would result in lane closures that could result in traffic congestion.	Short-term alteration of traffic circulation patterns would result in lane closures that could result in traffic congestion.	Minor change in traffic and circulation during construction.
mitigation:	Effects would be avoided or minimized by posting warning signs in advance of construction and maintaining open lanes at times of peak traffic and special events.	Effects would be avoided or minimized by posting warning construction signs in advance of construction and maintaining open lanes at times of peak traffic and special events.	Effects would be avoided or minimized by posting warning construction signs in advance of construction and maintaining open lanes at times of peak traffic and special events.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
Parking			
Effect:	Short-term loss of parking for the commercial development near West Julian Street.	Short-term loss of parking for the commercial development near West Julian Street.	Not applicable.
mitigation:	Effects would be minimized by providing additional offsite parking and a shuttle service to and from parking areas during construction activities.	Effects would be minimized by providing additional offsite parking and a shuttle service to and from parking areas during construction activities.	Not applicable.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Not applicable.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
Railroad			
Effect:	Potential disruption of railroad traffic.	Potential disruption of railroad traffic.	Not applicable.
mitigation:	Maintaining one operational railroad bridge would minimize this effect.	Maintaining one operational railroad bridge would minimize this effect.	Not applicable.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Not applicable.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Not applicable.
5.10 AIR QUALITY			
Effect:	Emissions of ROG, NO_x, and CO below conformity thresholds. '	Emissions of ROG, NO_x, and CO below conformity thresholds.	Emissions of ROG, NO_x, and CO below conformity thresholds.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
Effect:	Temporary increases in PM10.	Temporary increases in PM10.	Temporary increases in PM10.
mitigation:	Implementing BAAQMD feasible control measures would minimize effects associated with PM10.	Implementing BAAQMD feasible control measures would minimize effects associated with PM10.	Implementing BAAQMD feasible control measures would minimize effects associated with PM10.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	Potential for significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
5.11 NOISE			
Effect:	Temporary increase in noise; however, noise generated by the project would fall within the City of San Jose's noise-level objectives.	Temporary increase in noise. However, noise generated by the project would fall within the City of San Jose's noise-level objectives.	Remaining construction would have a minor effect on noise conditions.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	Less-than-significant adverse effect.
5.12 PUBLIC SERVICE			
Effect:	Potential disruption of public services during construction.	Potential disruption of public services during construction.	No disruptions of public services.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
5.13 HAZARDS AND HAZARDOUS WASTE			
Effect:	Potential to expose workers to contaminated soil during construction.	Potential to expose workers to contaminated soil during construction.	Not applicable.

TABLE 5.15-1. (Continued)

Resource and Issues	Bypass System Alternative	Refined Bypass System Alternative	No-Action Alternative
mitigation:	Effects would be avoided because contaminated areas would be cleaned up prior to the onset of construction activities and a soil management plan and hazardous and toxic materials control plan would be implemented.	Effects would be avoided because contaminated areas would be cleaned up prior to the onset of construction activities and because a soil management plan and hazardous and toxic materials control plan would be implemented.	No mitigation required because no hazards or hazardous materials were identified in Segment 3C Phase 2.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	No effect.
determination with mitigation:	Less-than-significant adverse effect.	Less-than-significant adverse effect.	No effect.
5.14 CULTURAL RESOURCES			
Effect:	Potential to effect known historic or prehistoric cultural resources is unlikely because no cultural resource sites were identified.	Potential to effect known historic or prehistoric cultural resources is unlikely because no cultural resource sites were identified.	Potential to effect known historic or prehistoric cultural resources is unlikely because no cultural resource sites were identified.
mitigation:	No mitigation required.	No mitigation required.	No mitigation required.
determination without mitigation:	No effect.	No effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.
Effect:	Potential to effect unknown historic or prehistoric cultural resources.	Potential to effect unknown historic or prehistoric cultural resources.	Potential to effect unknown historic or prehistoric cultural resources.
mitigation:	In the event sites are discovered during project construction, construction activities would cease, the site would be evaluated, and SHPO consulted.	In the event sites are discovered during project construction, construction activities would cease, the site would be evaluated, and the SHPO consulted.	In the event sites are discovered during project construction, construction activities would cease, the site would be evaluated, and the SHPO consulted.
determination without mitigation:	Potential for significant adverse effect.	Potential for significant adverse effect.	No effect.
determination with mitigation:	No effect.	No effect.	No effect.

5.16.1 Hydrologic and Hydraulic Conditions

Detailed hydraulic analyses have not been performed for this alternative; however, because the river segment between Park Avenue and Santa Clara Street would be bypassed under the Extended Bypass Alternative, flow velocities in this segment would likely decrease in comparison to the existing condition, rather than increase as they would under the Refined Bypass System Alternative. The effects of the Extended Bypass Alternative downstream from Los Gatos Creek would be similar to those of the Refined Bypass System Alternative (Section 5.1.3.2, "Hydraulic Analysis"). Because flow velocities would be less than those under the Refined Bypass System Alternative, this alternative would not require armoring of the riverbank and channel bed from San Fernando Street to downstream West Santa Clara Street. Velocities would be the same as those under the Refined Bypass System Alternative downstream from the bypass outlets near Coleman Avenue.

5.16.2 River Geomorphology

The sediment transport, bed and bank stability, and river morphology characteristics of the Extended Bypass Alternative could be different from those described under the Refined Bypass System Alternative. River morphology could be different because 2,572 lf less bank armoring and 1,216 lf less bottom armoring would occur under the Extended Bypass Alternative (Table 5.16-1). If water begins to enter the extended bypass at the same river flow as it does into the Guadalupe River Project with Refined Bypass System Alternative bypass, flow rates and volume during a flood event would be lower in a larger portion of Segment 3B, resulting in a slightly higher accumulation of sediment in Segment 3B. Effects on Segments 1 and 2, including channel erosion, would be the same as under the Refined Bypass System Alternative (Section 5.2.3.1, "Channel Erosion and Deposition"). The Extended Bypass Alternative would require the same MMP to monitor sediment transport and bed and bank stability as described under the Refined Bypass System Alternative (Section 5.2.3.1, "Channel Erosion and Deposition").

5.16.3 Water Quality

The potential for construction to affect water quality would be lower under the Extended Bypass Alternative than under the Refined Bypass System Alternative (Sections 5.3.3.1, "Suspended Solids and Biostimulatory Nutrients," and 5.3.3.2, "Toxic Constituents – Accidental Spills of Construction – Related Materials,") because less in-channel excavation would occur, further reducing the likelihood of spills of fuels or lubricants into the Guadalupe River. However, the effects associated with potential spills of equipment fuels or lubricants would be the same under the Extended Bypass Alternative. The measures to avoid and minimize adverse project effects during construction would be the same as for the Bypass System Alternative.

Potential disturbance of existing mercury-bound sediment would be less than the Refined Bypass System Alternative (Section 5.3.3.3, "Toxic Constituents – Mercury,") because there would be less channel bed and riverbank armoring in Segment 3B.

Compared to the Refined Bypass System Alternative, the Extended Bypass Alternative would have a much smaller effect on water temperatures and dissolved oxygen because substantially less riparian vegetation and SRA cover vegetation would be removed and there would be less

TABLE 5.16-1. Comparison of Riverbank and Riverbed Armoring for the Refined Bypass System Alternative and the Extended Bypass Alternative

The Extended Bypass Alternative would result in less riverbank and channel bed armoring than under the Refined Bypass System Alternative.

	Refined Bypass System Alternative		Extended Bypass Alternative		Difference	
Location	**Riverbank (lf)**	**Riverbed (lf)**	**Riverbank (lf)**	**Riverbed (lf)**	**Riverbank (lf)**	**Riverbed (lf)**
Segment 3A	1,440	695	1,440	695	0	0
Segment 3B	3,892	1,940	1,320	724	2,572	1,216
Totals	**5,332**	**2,635**	**2,760**	**1,419**	**2,572**	**1,216**

Assumptions:

Extended Bypass Alternative:

1. In Segment 3B, channel bed armoring will occur between Park Avenue and San Fernando Street.
2. In Segment 3B, riverbank armoring will occur between Park Avenue and San Fernando Street and 450 feet upstream from the New Julian Street Bridge (east bank only).

channel bed and riverbank armoring in Segment 3B (Table 5.16-2). The Alternative would affect 2.20 fewer acres of riparian vegetation 1,606 fewer lf of SRA cover, and 1,216 fewer lf of channel bed. Potential water temperature changes for the Extended Bypass Alternative have not been modeled, so the exact reduction in temperature in Segments 3A and 3B, and immediately downstream, is not known. However, because the Extended Bypass Alternative has fewer effects on riparian vegetation and SRA cover vegetation, the potential change in water temperature would not be as great as estimated for the Guadalupe River Project with Refined Bypass System Alternative. The amount of riparian vegetation and SRA cover vegetation mitigation and other related water temperature mitigation would be substantially less than required for the Guadalupe River Project with Refined Bypass System Alternative.

5.16.4 Biological Resources – Vegetation

Construction of the Extended Bypass Alternative would result in substantially fewer effects on riparian vegetation and SRA cover vegetation than under the Refined Bypass System Alternative. As shown in Table 5.16-2, the Extended Bypass Alternative would directly affect 3.21 acres of riparian vegetation, approximately 2.20 fewer acres than the Refined Bypass System Alternative. The Extended Bypass Alternative would directly affect approximately 2,183 lf of SRA cover vegetation, approximately 1,606 fewer lf than the Refined Bypass System Alternative (Table 5.16-2). Similar to the Refined Bypass System Alternative, no effects on wetlands, ruderal scrub and ruderal herbaceous vegetation, or special-status plant species would occur because these features are not known to occur in the study area.

5.16.5 Biological Resources – Wildlife

There would be fewer effects on the habitat of riparian wildlife species under the Extended Bypass Alternative than under the Refined Bypass System Alternative because less riparian vegetation would be removed. Potential effects on special-status wildlife species: the red-legged frog, burrowing owl, and southwestern pond turtle, remain unlikely.

TABLE 5.16-2. Comparison of Riparian Vegetation and SRA Cover Vegetation Impacts for the Refined Bypass System Alternative and the Extended Bypass System Alternative

	Refined Bypass System Alternative		Extended Bypass Alternative		Difference	
Location	Riparian Vegetation (ac)	SRA Cover Vegetation (lf)	Riparian Vegetation (ac)	SRA Cover Vegetation (lf)	Riparian Vegetation (ac)	SRA Cover Vegetation (lf)
Segment 3A	2.06	1,381	2.06	1,381	0	0
Segment 3B	3.35	2,408	1.15	802	2.20	1,606
Totals	**5.41**	**3,789**	**3.21**	**2,183**	**2.20**	**1,606**

Assumptions:

Extended Bypass Alternative:

1. In Segment 3B, SRA effects from armoring will occur between Park Avenue and San Fernando Street. It is assumed that there will be no effects from armoring from San Fernando Street to New Julian Street.
2. SRA cover vegetation effects were assumed at St. John Street from bridge removal only. No inlet or bank armoring will be associated with this alternative.
3. SRA cover vegetation effects were assumed at the upstream end of New Julian Street (east bank) from armoring.

5.16.6 Biological Resources – Fish

There would be fewer effects on anadromous and resident fish rearing under the Extended Bypass Alternative would be less than under the Refined Bypass System Alternative. Under the Alternative, 2.27 fewer acres of riparian vegetation and 1,628 fewer lf of SRA cover vegetation would be removed, resulting in smaller changes in water temperature, smaller loss of instream cover, and a smaller effect on anadromous and resident fish habitat. The Extended Bypass Alternative also would result in fewer effects on fish passage and spawning gravel because less channel bed would be armored.

Environmental commitments to protect fish similar to those developed for the Refined Bypass System Alternative would be required under the Extended Bypass Alternative; however, the amount of riparian vegetation, SRA cover vegetation mitigation, and low-flow channel and spawning gravel required would be substantially less than that required for the Refined Bypass System Alternative.

Under the Extended Bypass Alternative, effects on fish associated with hydrologic and hydraulic effects, channel erosion and deposition, and river morphology would be less than under the Refined Bypass System Alternative because there would be less area affected by velocity changes, less in-channel construction activities, and less channel armoring.

5.16.7 Land Use and Planning

As under the Refined Bypass System Alternative, operation of the Extended Bypass Alternative would be compatible with surrounding land uses. Construction of the Extended Bypass Alternative would temporarily disrupt existing uses of open space areas between Santa Clara and San Fernando Streets. This effect would be considered less than significant because the open space characteristics of the area would be reestablished once construction of the extended bypass has been completed.

5.16.8 Recreation, Public Access, and Visual/Aesthetic Resources

Under the Extended Bypass Alternative, the alignment of the east bank recreation trails, however, would be altered under this alternative. The east bank recreational trail would not pass under the San Fernando, Santa Clara, St. John, and New Julian Street Bridges, but would instead be constructed at grade to ensure continuous public access to the east side of the Guadalupe River. The trails would be at the top of the bank and farther from the water because of the reduced bank armoring. There would still be long-term beneficial effects associated with increasing public access to Segments 3A and 3B and short-term adverse effects associated with construction. Impacts on boating would be less than those under the Refined Bypass System Alternative.

The change in the visual character of the river corridor under the Extended Bypass Alternative would be less than that under the Refined Bypass System Alternative because less riparian vegetation would be removed. The modified east bank trail system would provide fewer views of the river than the trail system proposed under the Refined Bypass System Alternative because there would be five fewer underbridge trails.

5.16.9 Transportation and Traffic

The effects of constructing the Extended Bypass Alternative on parking and railroad operation would be identical to those under the Refined Bypass System Alternative. However, the effects of the Extended Bypass Alternative on roadway capacity and circulation would be substantially different from the effects under the Refined Bypass System Alternative.

The Extended Bypass Alternative would generate approximately 20 percent more vehicle trips associated with employee commutes and the hauling of materials than would the Refined Bypass System Alternative. These additional trips would be necessary because constructing the longer bypasses would require transporting more material from and to the project site. Although extending the bypass would increase the number of vehicle trips during peak commute hours, the increase would not substantially affect roadway capacity and the effect would remain less than significant.

The Extended Bypass Alternative would result in the closure of a portion of New Julian Street, West Santa Clara Street, and San Fernando Street to accommodate bypass construction. In the vicinity of the bypass, average daily traffic on San Fernando Street is 12,000 vehicles per day. This number is equal to approximately one-half of the average daily traffic on West Santa Clara Street. The combined closure of San Fernando Street and partial closures of West Santa Clara and New Julian Streets would result in a significant unavoidable effect on West Santa Clara Street. This effect would require mitigation similar to that described for the Refined Bypass System Alternative, possibly including closing only one lane at a time during peak traffic periods and staging the closings so that construction work on San Fernando Street could take place either before or after the work on West Santa Clara Street.

The Extended Bypass Alternative would require removing bridge piers and would make it necessary to reconstruct a portion of State Route 87 between West Santa Clara Street and Park Avenue. Traffic on State Route 87 would have to be rerouted to surface streets during construction. This would result in an unavoidable significant effect on transportation and traffic. Construction of the extended bypass would require extensive and lengthy

coordination with Caltrans before the removal of support piers for State Route 87 between West Santa Clara Street and Park Avenue.

5.16.10 Air Quality

Vehicle emissions generated by construction of the Extended Bypass Alternative would be greater than those generated by construction of the Refined Bypass System Alternative because of increases in traffic associated with additional employee commute trips and trips required to transport materials to and from the construction site. The construction equipment required to excavate additional material from the bypass would also generate more emissions than those under the Refined Bypass System Alternative. Although the air emissions generated under this alternative would be greater compared to the Refined Bypass System Alternative, effects on air quality would be well below the ROG and NO_x conformity thresholds.

5.16.11 Noise

Noise generated by construction of the Extended Bypass Alternative would be greater than under the Refined Bypass System Alternative because of additional vehicle trips required to transport materials to and from the construction site, additional heavy equipment needed to construct the longer bypass, and additional construction associated with the removal and reconstruction of State Route 87. Noise levels associated with construction of the Extended Bypass Alternative would increase only in the portion of the project site between the outlet of the Woz Way to Park Avenue bypass reach and West Santa Clara Street. Although noise levels generated by construction of the Extended Bypass Alternative are expected to be higher than under the Refined Bypass System Alternative, the noise levels are expected to fall within the City of San Jose's noise-level objectives.

5.16.12 Public Services and Utilities

Impacts on public services and utilities of the Extended Bypass Alternative would be the same as those described for the Refined Bypass System Alternative.

5.16.13 Hazards and Hazardous Materials

The potential to expose workers to hazards and hazardous materials would be slightly greater under the Extended Bypass Alternative than under the Refined Bypass System Alternative because a larger amount of material would be excavated and transported from the project site.

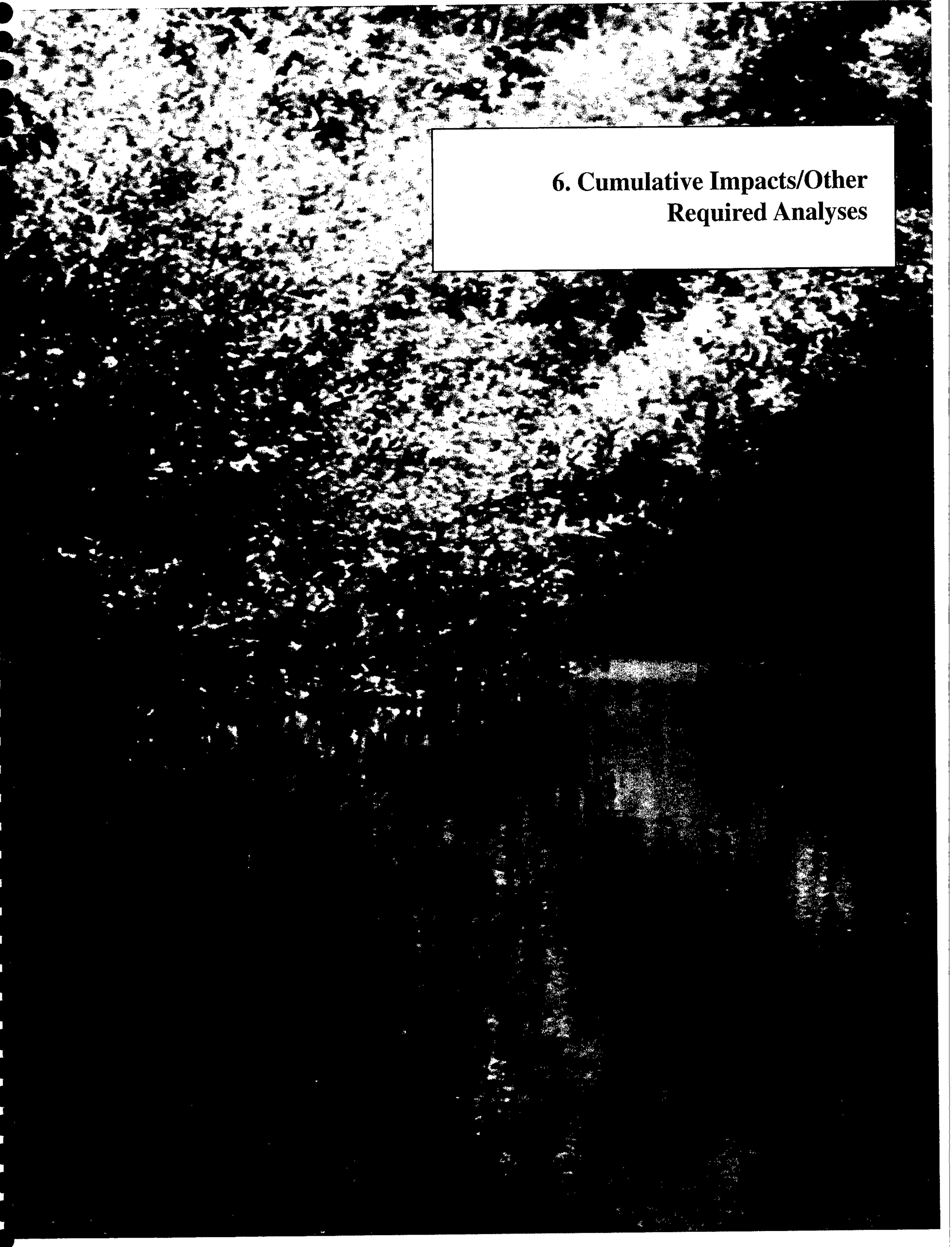
5.16.14 Cultural Resources

The potential of the Extended Bypass Alternative to affect cultural resources would be nearly the same as under the Proposed Alternative because previous surveys have identified no cultural resources in the project area. The potential to affect unknown cultural resources would be slightly increased because the amount of land area disturbed would be larger than under the Refined Bypass System Alternative.

5.16.15 Conclusions

The Extended Bypass Alternative would not meet project criteria for schedule, constructablity, right-of-way, or Caltrans coordination, and would have exceedingly high costs. The Corps and SCVWD determined that the Extended Bypass Alternative would be included in this SEIS/EIR because it fulfills CEQA requirement for an alternative that would substantially lessen the effects of the Refined Bypass System Alternative. This alternative would result in less bank and channel bed armoring between West Santa Clara Street and San Fernando Street, fewer effects on riparian vegetation and SRA cover and fish habitat, and would likely require less mitigation. The Extended Bypass Alternative would require extensive coordination with Caltrans for use of the right of way and reconstruction of State Route 87. The alternative results in significant and unavoidable effects on traffic in the San Jose area because of the need to close State Route 87 during reconstruction. Selection of the Extended Bypass Alternative would be expected to add 2 to 4 years to the design and construction schedule. It is estimated that the cost of the Extended Bypass Alternative would be $40-100 million more than the Refined Bypass System Alternative, depending on the design for the rebuilding of State Route 87. The modest incremental environmental gain has been judged to be not worth the substantial incremental cost to obtain it. In addition, delay in obtaining reduced flood damage benefit and public recreation use benefit from completing the project as scheduled would add to this cost.

6. Cumulative Impacts/Other Required Analyses



KEY CHANGES BETWEEN DRAFT & FINAL REPORT

This Final Report (Final GRR/EIR-SEIS) reflects revisions to the Draft Report (Draft GRR/EIR-SEIS). These revisions were made in response to comments received on the Draft Report during the June 23 to August 9, 2000, public review of that document. Please note these key revisions in Chapter 6:

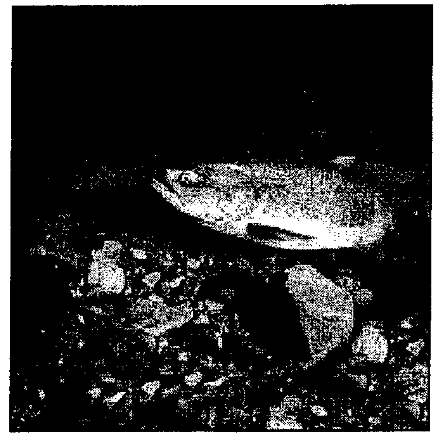
The Cumulative Impact Analysis has been revised to consider nine other planned projects that are also likely to be constructed in the Guadalupe River watershed in addition to those projects previously addressed in the Draft Report.

Specific responses to comments on the Draft Report are presented in Appendix 4 (Volume 2) with highlights and strikeouts showing where portions of the Draft Report were modified as reflected in this Final Report.

CHAPTER 6

Cumulative Impacts and Other Required Analyses

6.1 Introduction



This chapter analyzes the cumulative impacts on the Guadalupe River system of the:

- Guadalupe River Project with Bypass System Alternative and other past, present, and reasonably foreseeable future actions
- Guadalupe River Project with Refined Bypass System Alternative (Proposed Action) and other past, present, and reasonably foreseeable future actions
- No-Action Alternative and other past, present, and reasonably foreseeable future actions
- This chapter also addresses other required analyses, including the:
- Relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity with implementation of the Guadalupe River Project with Refined Bypass System Alternative
- Irreversible or irretrievable commitments of resources related to the Guadalupe River Project with Refined Bypass System Alternative
- Growth-inducing impacts of the Guadalupe River Project with Refined Bypass System Alternative
- Identification of the environmentally preferred and environmentally superior alternative

For the purposes of this assessment, the Guadalupe River system is considered to encompass the Guadalupe River main stem from its mouth at Alviso Slough in southern San Francisco Bay to its confluence with Alamitos and Guadalupe Creeks, as well as the following major tributaries of the Guadalupe River: Los Gatos Creek, Canoas Creek, Ross Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero. The study areas for Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero extend upstream to their respective reservoirs (Figure 6.1-1 and Table 6.1-1).

6.2 Cumulative Impacts – Bypass System Alternative and Other Guadalupe River Projects

The term "cumulative impacts" refers to the net impact of two or more individual impacts that, when evaluated together, are considerable or compound or increase other

environmental impacts. The cumulative impact of several projects is the change in the environment that results from the incremental impact of a Bypass System Alternative when added to the incremental impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

TABLE 6.1-1. Stream Segments Included in the Cumulative Impact Assessment for Biotic Resources

Stream	Segment	Total Stream Miles
Guadalupe River	Alviso Slough (UPRR Bridge) to confluence with Alamitos Creek	18.8
Los Gatos Creek	Confluence with Guadalupe River to Lexington Reservoir	11.0
Canoas Creek	Confluence with Guadalupe River to Cottle Avenue	7.6
Ross Creek	Confluence with Guadalupe River to Kennedy Road	5.6
Guadalupe Creek	Confluence with Guadalupe River to Guadalupe Reservoir	5.5
Alamitos Creek	Confluence with Guadalupe River to Arroyo Calero to Almaden Reservoir	7.2
Arroyo Calero	Confluence with Alamitos Creek to Calero Reservoir	4.0
Total		**59.7**

Source: The Habitat Restoration Group, 1991 (unpublished data).

This section first identifies and describes projects other than the Bypass System Alternative that have been approved or are under construction in the Guadalupe River watershed. Cumulative impacts will be addressed for these projects. Related projects that are under consideration are also described, although the quantitative impacts of these projects are not known at this time.

Cumulative impacts and mitigation measures are first discussed for the entire Guadalupe River Project with Bypass System Alternative, including the incremental impacts of the Bypass System Alternative, in combination with other projects in the Guadalupe River watershed. Cumulative impacts and mitigation measures are then addressed for the Refined Bypass System Alternative in combination with other projects in the Guadalupe River watershed. Next, cumulative impacts and mitigation measures are addressed for the No-Action Alternative in combination with other projects in the Guadalupe River watershed. Cumulative impacts are discussed for each resource addressed in this Report.

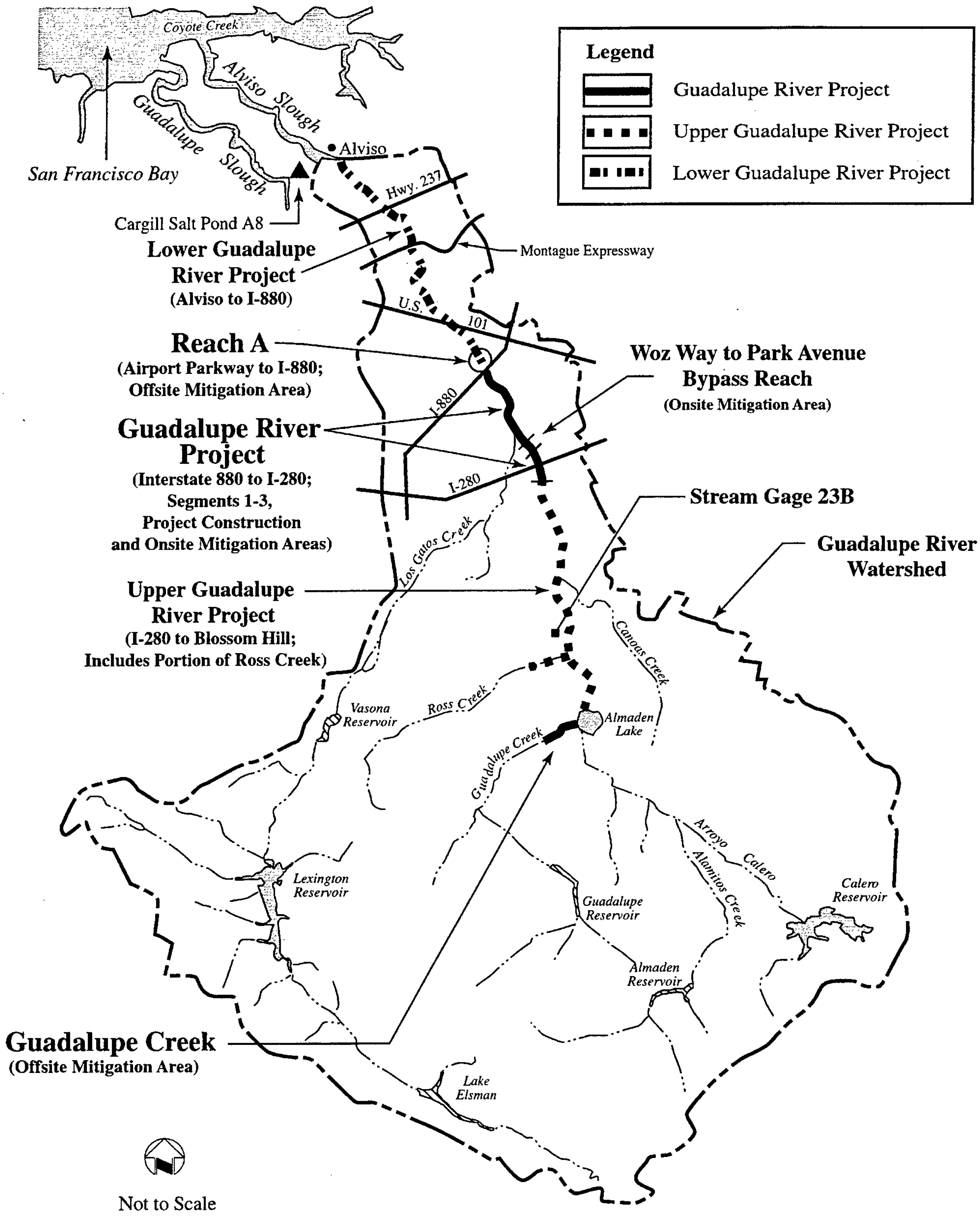


Figure 6.1-1. Guadalupe River Watershed Including Project Construction and Mitigation Areas

6.2.1 Projects Addressed in the Cumulative Impact Analyses

Eighteen major projects in the Guadalupe River system have been approved, are under construction, or have been proposed by other public agencies:

- Guadalupe River Park Project
- State Route 87 Freeway Upgrade Project from Highway 101 to Julian Street
- State Route 85 Transportation Corridor Project
- San Jose International Airport Expansion Plan
- Santa Clara Valley Water District Fish Ladder Construction Program
- Guadalupe Creek Restoration Project
- Upper Guadalupe River Flood Control Project
- Lower Guadalupe River Flood Protection Project
- Stormwater Pump Installations
- Virginia Street Bank Stabilization Project
- Santa Clara Valley Water District Stream Maintenance Program
- Alviso Ring Levee Wetland Mitigation and Restoration Project
- Almaden Quicksilver County Park Project
- Boston Property Project
- John P. McEnery Park Site Improvements
- Los Gatos Creek Trail Project
- Vasona Light Rail Extension Project
- CORE Location Project

When combined with the Guadalupe River Project with Bypass System Alternative, these projects have the potential to produce cumulative impacts on resources in the project area and are therefore addressed in this cumulative impact analysis. These projects are discussed in detail below.

6.2.1.1 Guadalupe River Park Project

This project is a master plan for the development of recreational facilities along the Guadalupe River. In 1988, the City developed a Guadalupe River Park Master Plan and prepared an EIR for a regional urban river park along the Guadalupe River between I-280 and I-880 (City of San Jose, 1989). The 1988 Guadalupe River Park Master Plan included an almost continuous river walk between I-280 and I-880 on both the east and west banks of the river, access points at the intersections of roadways and the river walk, and a waterfall at the outlet of the Woz Way to Park Avenue bypass reach.

In 1991, the Corps and SCVWD prepared an EA/IS to address modifications to the Authorized Project (U.S. Army Corps of Engineers, 1991a). The EA/IS assessed the additional impacts on land use, riparian corridor vegetation, and fish and wildlife habitat that would result from the trail construction and recreational use associated with the Guadalupe River Park Project. Twenty-two residences and six businesses were relocated.

Key modifications included replacing concrete floodwalls and riprapped side slopes with planted gabion and stone terraces as well as components of the 1988 Guadalupe River Park Master Plan described above. In 1995, the City of San Jose Redevelopment Agency developed a revised Guadalupe River Park Master Plan that was "overlaid" on the Corps' Authorized Project (San Jose Redevelopment Agency, 1995). Under this plan, portions of the proposed park were expanded downstream from the confluence of the Guadalupe River and Los Gatos Creek, and trail and access point locations were refined. The City of San Jose Redevelopment Agency has already constructed portions of the Guadalupe River Park Project. The Woz Way to Park Avenue river walk, which has been completed, consists of a system of trails along the tops of the banks of the Guadalupe River between Woz Way and Park Avenue (Figure 3.4-9). The Confluence Point and West project, located at the confluence of Los Gatos Creek and the Guadalupe River, includes a park, trails, riverbank gabions, and a pedestrian bridge over Los Gatos Creek (Talbot, pers. comm.). The Confluence Point and West project has been completed except for the pedestrian bridge.

The Guadalupe River Project with Bypass System Alternative includes components of the Guadalupe River Park Project, as described in Section 3.4, "Bypass System Alternative (Action Bypass)," and shown in Figure 3.4-1. Those portions of the Guadalupe River Park Plan that have already been constructed and the components included in the Guadalupe River Project with Bypass System Alternative are evaluated in this cumulative impacts analysis.

The City is presently revising specific design components of the Guadalupe River Park Project in Segments 3A and 3B. The Guadalupe River Park Master Plan is not being revised. Potential impacts of trail system development and recreational use will be addressed in an EIR when the park master plan is finalized. These impacts could include disturbance of wildlife and trampling of existing riparian vegetation and riparian revegetation areas.

6.2.1.2 State Route 87 Freeway Upgrade Project

The State Route 87 Freeway Upgrade Project will convert the existing four-lane Guadalupe Parkway (State Route 87) to a six-lane freeway between Julian Street and Highway 101 and includes the construction of the Skyport Bridge. State Route 87 improvements are designed to relieve severe congestion along Guadalupe Parkway and to improve access to downtown San Jose, the Civic Center area, and San Jose International Airport. The target date for completion of the State Route 87 Freeway Upgrade Project is December 2003 (Gonzales, pers. comm.). SCVWD has been a full member of the State Route 87 Project Development Team since 1987. Over the past 13 years, SCVWD staff has participated in numerous State Route 87 meetings and workshops, especially those regarding locations where the freeway project interfaces with the Guadalupe River. The Corps and SCVWD will continue to coordinate with the California Department of Transportation and the Valley Transportation Authority on the design and construction activities of the Guadalupe River Project and the State Route 87 Freeway Upgrade Project.

Freeway widening and bridge construction from Highway 101 to New Julian Street resulting from implementation of the State Route 87 Freeway Upgrade Project will affect 1.09 acres of wetlands under the jurisdiction of the Corps and 5.72 acres of riparian habitat. The project includes construction of a top-of-bank trail along the east bank of Segments 1 and 2 of the Guadalupe River. Construction began in 1999 and will be completed in 2003. This project will have no long-term impacts on fish resources.

Mitigation for loss of riparian habitat and wetlands that would result from the State Route 87 Freeway Upgrade Project requires the planting of 10.95 acres of riparian habitat adjacent to the east side of the Guadalupe River (David Powers and Associates, 1993, Vincent, pers. comm. , Hessler, pers. comm.).

6.2.1.3 State Route 85 Transportation Corridor Project

The State Route 85 Transportation Corridor Project was completed in 1996. It directly affected 0.1 acre of riparian vegetation along the main stem Guadalupe River and indirectly affected 4.5 acres on Los Gatos and Ross Creeks. Mitigation for the loss of riparian habitat required the planting of 12.1 acres of riparian vegetation onsite and 0.2 acre offsite (Monette, pers. comm.). Bridge construction under this project did not adversely affect fisheries, and fish passage was provided to ensure that there would be no adverse impacts on fish resources in Ross Creek (Monette, pers. comm.).

6.2.1.4 San Jose International Airport Expansion Plan

The San Jose International Airport Expansion Plan includes construction between 2002 and 2004 of a consolidated rental car garage on the east side of the Guadalupe River at the downstream end of Reach A and construction in 2001 of a two-lane access bridge to the rental car garage approximately 1,200 feet downstream from Airport Parkway that will connect Airport Boulevard and the existing parking lot/future garage. No impacts on riparian vegetation or wetlands are expected.

6.2.1.5 Santa Clara Valley Water District Fish Ladder Construction Program

SCVWD has almost completed a comprehensive program to remove barriers to fish and/or install fish ladders at barriers on Upper Penitencia Creek, Coyote Creek, the Guadalupe River, and Guadalupe Creek. On the Guadalupe River, partial barriers at the Hillsdale Avenue crossing and downstream from the confluence of Ross Creek and the Guadalupe River have been removed. Vortex rock weirs were constructed in late 1998 that allow for upstream and downstream migration of salmonids. In November 1999, a step-pool fish ladder was constructed on the east bank of the Guadalupe River at the Alamitos drop structure downstream from Coleman Road. The ladder allows migrating salmonids to reach the upper watershed areas, including Alamitos Creek, Arroyo Calero, and Guadalupe Creek. Nine trees and 82 lf of SRA cover vegetation were affected by the project. Project impacts were mitigated directly upstream; the mitigation included planting 18 trees to create a minimum of 82 lf of SRA cover vegetation. Up to 0.17 acre of wetlands would be affected by the project. This wetland habitat is expected to recover naturally.

SCVWD is also constructing a fish ladder on Guadalupe Creek at Masson Dam, downstream from Camden Avenue. The ladder will allow migrating salmonids to reach the upper Guadalupe Creek watershed. The project will result in the loss of three cottonwood tree clusters and 17 lf of SRA cover vegetation. These impacts have been mitigated at the

Guadalupe Creek Restoration Project – Phase 1 (see below). The trees were replaced at a 2:1 ratio and the SRA cover vegetation at a 1:1 ratio.

6.2.1.6 Guadalupe Creek Restoration Project

The Guadalupe Creek Restoration Project site is bordered upstream by Masson Dam, downstream by Almaden Expressway, to the north by residential development and the Los Capitancillos percolation pond system, and to the south by Coleman Road. SCVWD is proposing to establish an estimated 12,044 lf of SRA cover vegetation and improve aquatic habitat at this site to offset environmental impacts associated with future SCVWD projects. An EIR/EIS addressing the potential effects of the Guadalupe Creek Restoration Project is expected to be completed in 2001. The Guadalupe Creek Restoration Project is scheduled for implementation in 2001.

The banks of Guadalupe Creek are typically dominated by open ruderal habitat interspersed with stands of riparian forest and scrub or patches of coyote brush scrub and Himalayan blackberry bramble. The width of the riparian vegetation varies from the width of a single tree canopy to approximately 200 feet; some areas of the riverbank have no riparian vegetation. Patches of riverine wetlands are also found along the edges of the base-flow channel and along low-lying benches and bars below the creek's ordinary high water mark. Preproject riparian habitat totals approximately 10.10 acres. There are 1.23 acres of wetlands under the jurisdiction of the Corps and approximately 2,398 lf of SRA cover vegetation (Jones & Stokes, 1999b).

An estimated 0.51 acre of riparian vegetation would be affected by implementation of the mitigation plan. A total of approximately 1.0 acre of riparian habitat would be planted to mitigate for impacts. It is estimated that 833 lf of SRA cover vegetation would be affected by implementation of the mitigation plan and approximately 1,277 lf of SRA cover vegetation would be planted to mitigate for impacts. In 1998, approximately 1,246 lf of native riparian vegetation was planted in the Guadalupe Creek mitigation area. The affected SRA cover vegetation will be mitigated onsite at a 1:1 ratio.

The mitigation area design would affect approximately 0.94 acre of jurisdictional wetland habitat and some or all of the other waters of the United States. In-kind, instream wetland habitat mitigation may be possible during the early stages of riparian vegetation development; however, as the riparian vegetation matures, instream wetlands may be subjected to too much shade, and the vegetation may become sparser or may no longer be present. Long-term, in-kind instream mitigation is therefore not feasible. In-kind, offstream wetland mitigation may also be constructed within the mitigation area, or wetland mitigation may include construction of out-of-kind wetlands, such as riparian wetland, through the planting of riparian vegetation adjacent to the low-flow channel. The affected wetlands will be mitigated onsite at a 1:1 ratio.

The Guadalupe Creek Restoration Project site is a highly suitable site for providing mitigation for a variety of activities in the Guadalupe River watershed. The Guadalupe River Project with Bypass System Alternative proposes to use a portion of the Guadalupe Creek Restoration Project site to mitigate for impacts on SRA cover vegetation and aquatic habitat. SCVWD will manage and protect the mitigation site in perpetuity. The Guadalupe Creek Restoration Project is independent of the Guadalupe River Project with Bypass System Alternative and will be implemented even if the Guadalupe River Project with Bypass System Alternative is not implemented.

6.2.1.7 Upper Guadalupe River Flood Control Project

The Upper Guadalupe River Flood Control Project (Upper Guadalupe River Project) is proposed by SCVWD to reduce the potential for flood damage along the upper Guadalupe River (Figure 6.1-1). The project includes channel modifications along eight reaches of the upper Guadalupe River. Proposed channel modifications include constructing bypass channels, widening the channel, adding benches, lining portions of the channel bank with gabions and cribwalls, and constructing floodwalls and levees. These modifications are designed to increase the capacity of the Guadalupe River. The project has a total length of approximately 6.4 miles and is divided into two discrete segments: one from Highway 101 to I-880 (Reach A) and another from I-280 to above Blossom Hill Road (Reaches 6 to 12). Modifications are also proposed on adjacent portions of two tributaries, Canoas Creek and Ross Creek. Construction of the Upper Guadalupe River Project is expected to take place over the 25-year period from 2000 through 2025. Expected flows from a flood protection project in the upper Guadalupe River were included in the modeling of the design floodflow for the Guadalupe River Project with Bypass System Alternative.

The Corps' 1985 Guadalupe River Interim Feasibility Report and EIS (U.S. Army Corps of Engineers, 1985; Section 1.6.1, "Guadalupe River Interim Feasibility Report and Environmental Impact Statement (1985)), did not find economic justification for proposed channel modifications upstream from I-280. SCVWD, in the late 1980s, initiated an independent planning study for the Upper Guadalupe River Project. Planning and design of the Upper Guadalupe River Project continued concurrent with construction of Segments 1 and 2 of the Authorized Project. In 1997, SCVWD and the Regulatory Branch of the Corps, San Francisco District, prepared a draft EIR/EIS for the Upper Guadalupe River Project (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 1997). A final EIR/EIS was issued in July 2000, which includes Volume IX, "Additional Information," for public review (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 2000a).

The Upper Guadalupe River Project, as presently proposed, will affect approximately 10.45 acres of riparian vegetation, 4,886 lf of SRA cover vegetation, and 1.47 acres of wetlands. Other impacts of the Upper Guadalupe River Project include short-term elevations in stream water temperatures and a net decrease in the amount of in-channel armoring. Informal consultation with USFWS on this project was completed in 1997. No adverse impacts on listed terrestrial vertebrates or plants were identified.

Proposed channel modifications would result in beneficial impacts on stream ecology, hydrology, and fisheries. These include permanently fixing the concrete apron and weir at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing downstream from Ross Creek (Reach 11B) to provide improved passage for fish (interim fixes were completed in November 1998). Both structures are potential barriers to upstream migration by adult salmon and steelhead. Only during peak urban storm runoff or prolonged watershed runoff are flows high enough to allow successful fish passage. Permanently fixing the interim structures would improve access for migrating fish from San Francisco Bay upstream to the drop structure above Blossom Hill Road. SCVWD would also move Stream Gage Station No. 23B, a partial barrier to fish migration, from its location in the vicinity of Pearl Avenue Bridge downstream to the vicinity of the northbound Almaden Expressway bridge (Reach 10B). The new stream gage will be constructed so that it will not be a barrier to fish migration. Stepped pools would be constructed at the Ross Creek confluence and at the Alamitos drop structure upstream from Blossom Hill Road. SCVWD would also improve

fish passage conditions on Guadalupe Creek at Stream Gage Station No. 43 and at a concrete channel stream reach midway between the confluence of Pheasant Creek with Guadalupe Creek and Reynolds Road to provide access for migrating fish to an additional 1.3 miles of stream habitat upstream from Mason Dam. In addition, SCVWD proposes to provide for fish passage at the gabion structure on Alamitos Creek upstream from Mazzone Drive and at Stream Gage Station No. 16 on Alamitos Creek. These improvements would provide access for migratory fish to approximately 10.9 miles of upstream fish habitat. Vortex rock weirs would be constructed between Willow Glen Way and Branham Lane (Reaches 9, 10, and 11) to provide instream cover and deepen the feeding areas for fish in the riffle reach of the channel. The weirs would act as a grade-control structure and prevent upstream lateral migration, bank erosion, and aggradation. They would also maintain a low width-to-depth ratio, which would reduce the likelihood of sand or gravel bar deposition and maintain the sediment transport capacity of the stream. The project would remove approximately 5,930 lf (134,400 sf) of rubble in the construction area. Approximately 3,375 lf (0.6 bank mile; 84,300 sf) would become natural bank. The Upper Guadalupe River Project is also expected to reduce the frequency and quantity of bank erosion, thereby improving water quality. The proposed riparian mitigation (Table 6.2-1) would also provide for a more continuous riparian corridor along the upper Guadalupe River by reducing the number and lengths of gaps in riparian vegetation.

Table 6.2-1 summarizes proposed SRA cover vegetation and riparian habitat mitigation for both the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project; none of the proposed mitigation for the Upper Guadalupe River Project is included as mitigation for the Guadalupe River Project with Bypass System Alternative. After completion of the Upper Guadalupe River Project, the Guadalupe River immediately upstream from I-280 will have a channel capacity of 14,600 cfs, which is equal to the peak discharge for the design floodflow on the Guadalupe River upstream from Los Gatos Creek (Section 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions"). Hydrologic modeling for the Guadalupe River Project with Bypass System Alternative incorporated the upstream floodflows expected to result from completion of the Upper Guadalupe River Project.

6.2.1.8 Lower Guadalupe River Flood Protection Project

The proposed Lower Guadalupe River Flood Protection Project (Lower Guadalupe River Project) includes flood protection measures on the Guadalupe River between I-880 and the Alviso UPRR Bridge and downstream from the Alviso UPRR Bridge in Alviso Slough (Figure 6.1-1). The entire length of this project has earthen levees on both banks.

In 1985, during the planning and design of the Guadalupe River Project, it was understood, based on the best available information, that the lower Guadalupe River had adequate capacity to safely convey the 100-year design floodflow of 17,000 cfs (U.S. Army Corps of Engineers, 1985). No adverse impacts on lower Guadalupe River hydrologic or hydraulic

TABLE 6.2-1. SRA Cover and Riparian Habitat Mitigation for the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project

This table itemizes the linear feet of SRA cover mitigation and acres of riparian habitat mitigation for the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project. The purpose of the table is to demonstrate that there is no mitigation overlap between the two projects.

Mitigation Site	Guadalupe River Project SRA (lf)[a]	Guadalupe River Project Riparian (ac)	Upper Project SRA (lf)	Upper Project Riparian (ac)
Segments 1, 2, and 3	2,534	21.0	–	–
Bypass Reach (Woz Way)	410	–	–	–
Reach A (airport reach)	7,848	–	–	–
Reach 6–10A	–	–	3,650	7.61
Reach 10B	–	–	2,180	2.52
Reach 10C–11	–	–	6,543	8.29
Reach 12	–	–	975	6.70
Reach 13	–	–	–	1.29
Guadalupe Creek	12,044	–	–	–
Barrier Removal – Guadalupe River	–	–	Provide permanent fish passage	–
Barrier Removal – Upper Guadalupe Creek	–	–	Provide permanent fish passage	–
Cumulative: Barrier Removal – Alamitos Creek	–	–	Provide permanent fish passage	–
Total of Potential Mitigation	22,836	21.0	13,348	26.41
Needed	18,026[b]	21.0	4,886	20.89

[a] Assumes implementation of Bypass System Alternative.
[b] Total need for mitigation is based on HEP Analysis. Excess SRA cover vegetation mitigation credits on Guadalupe Creek would be used by SCVWD to mitigate for other projects.
– = No mitigation for this project in this reach.

conditions were expected as a result of the Guadalupe River Project. In a 1991 agreement with the Corps, SCVWD certified that the lower Guadalupe River had the capacity to safely convey the 100-year design floodflow.

After the January and March 1995 storm events on the Guadalupe River, SCVWD initiated studies to re-assess the conveyance capacity of the lower Guadalupe River. In 1998, SCVWD completed the analysis and concluded that the lower Guadalupe River below I-880 does not have sufficient capacity to convey the 100-year design floodflow of 17,000 cfs. From Trimble

Road downstream to the town of Alviso, channel capacity has been reduced by approximately 40 percent, primarily because of sediment deposition. In addition, the hydraulic modeling of the lower Guadalupe River used in the analysis assumed that vegetation in the river is mature, which results in an increase in channel roughness. This assumption decreased the modeled capacity of the lower Guadalupe River.

SCVWD is currently developing the Lower Guadalupe River Project to restore the channel capacity between I-880 and the Alviso UPRR Bridge and to identify alternatives for conveying floodflows downstream from the Alviso UPRR Bridge (Figure 6.1-1). The Lower Guadalupe River Project would be implemented by SCVWD to restore the channel capacity guaranteed in SCVWD's 1991 agreement with the Corps. The Lower Guadalupe River Project will provide channel capacity to convey flows from the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project.

In 1998, the Corps, SCVWD, and the resource agencies (USFWS, NMFS, CDFG, and the San Francisco Bay RWQCB) agreed through a collaborative process, described in Chapter 7, to modify the Guadalupe River Project by using a bypass to avoid impacts on environmental resources. The collaborative discussed whether it was appropriate to proceed with the Guadalupe River Project in light of the new information on the decreased capacity of the lower Guadalupe River. The resource agencies allowed the Guadalupe River Project to remain a separate project on schedule for completion in 2004. Completion of the Lower Guadalupe River Project is scheduled for 2002. The cumulative impact analysis contained in this Report includes an analysis of the Upper and Lower Guadalupe River Projects and the Guadalupe River Project with Bypass System Alternative to assist in a full understanding of the projects and their related flood protection components.

The Lower Guadalupe River Project EIR/EIS will address a full range of alternatives for flood protection downstream from I-880 and for conveying floodflows downstream from Alviso. The alternatives will be designed to contain the increased flows that would result from the operation of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project and to minimize or avoid impacts on environmental resources in the Guadalupe River watershed, including listed species and their habitat. Flood protection elements could include raising existing levees, setting levees farther back from the river, constructing offstream storage, constructing flood bypasses, dredging the channel, or a combination of some or all of these elements. The Lower Guadalupe River Project EIR/EIS will address the potential direct, indirect, and cumulative impacts of each alternative on natural resources in the Guadalupe River watershed, including the Alviso Slough area. SCVWD will consult with USFWS's Endangered Species Division regarding the potential hydrologic and hydraulic impacts of the Lower Guadalupe River Project. If an impact is identified, appropriate mitigation measures will be included in the EIR/EIS and BA for the Lower Guadalupe River Project, and SCVWD will prepare an MMP for the Lower Guadalupe River Project for review and approval by the Endangered Species Division. Included in the alternatives screening and impact analyses will be the assessment of the potential effect of alternatives on public access to existing and future trails along the Guadalupe River corridor as well as potential effects on the Alviso Marina County Park.

The EIR/EIS and BA for the Lower Guadalupe River Project will also address the cumulative impacts of all projects in the Guadalupe River watershed that would affect the river's resources. The analysis of cumulative impacts will include, but not be limited to, the Guadalupe River Project with Bypass System Alternative, the Upper Guadalupe River

Project, and the Lower Guadalupe River Project. Construction of the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative would not foreclose or limit options to develop appropriate mitigation for cumulative impacts determined in the Lower Guadalupe River Project EIR/EIS.

The Lower Guadalupe River Project EIR/EIS will identify alternatives and evaluate the potential impacts of each alternative. To estimate potential impacts of the Lower Guadalupe River Project for this cumulative impact analysis, two alternatives for the Lower Guadalupe River Project that encompass the potential range of impacts of the project have been considered. One alternative would restore the original design capacity by removing sediment from the entire channel between Highway 101 and the Alviso UPRR Bridge. This alternative focuses on instream modifications and represents an alternative at the upper range of expected impacts. This alternative could result in the temporary removal of approximately 65 acres of wetlands and affect an estimated 30 acres of other waters of the United States. An estimated 2.5 acres of riparian habitat, including SRA cover vegetation, could be removed, primarily downstream from Montague Expressway. Most of the temporary impacts on wetlands would be self-mitigating because the wetlands would be likely to reestablish. However, the types of species in the wetlands and their distribution may be different. It may also take several seasons for wetlands to reestablish throughout the channel. The significance of this change has not been evaluated nor have all potential mitigation options. However, impacts on riparian habitat will be mitigated.

An alternative at the lower range of expected impacts would avoid instream work. Such an alternative could include flood bypasses, raising levees, setting back levees, constructing offstream storage, or some combination of these techniques. This alternative would avoid impacts on wetlands and SRA cover vegetation and minimize impacts on riparian habitat, aquatic resources, water quality, and aesthetic resources. It is likely that the selected project alternative ultimately will be a combination of many options, such as instream and out-of-channel structural modifications and modifications to operations and maintenance practices. Between the Alviso UPRR Bridge and the confluence of Alviso Slough with Coyote Creek and San Francisco Bay, potential modifications include raising existing levees, building new floodwalls, setting levees farther back from the slough, establishing a floodplain terrace, or a combination of these alternatives.

This cumulative impact analysis assumes that a combination of instream and out-of-channel structural modifications will be implemented between Highway 101 and the Alviso UPRR Bridge as part of the Lower Guadalupe River Project. The analysis assumes that a combination of floodwalls/levees and a floodplain terrace will be implemented downstream from the Alviso UPRR Bridge in the Alviso Slough area.

The lower Guadalupe River between the I-880 bridge and the Highway 101 bridge currently has a channel capacity of approximately 17,000 cfs. Between the Highway 101 bridge and the Highway 237 bridge, the channel capacity is limited to approximately 14,000 cfs. The channel capacity between the Highway 101 bridge and the Highway 237 bridge serves to limit the peak floodflows that can be conveyed in the lower Guadalupe River. Under existing conditions, flows greater than 14,000 cfs break out of the channel along the lower Guadalupe River upstream from the Highway 237 bridge. Downstream from the Highway 237 bridge, floodflows in the Guadalupe River are limited to 14,000 cfs. Floodflows overtop the west levee into adjacent salt evaporation ponds just downstream from the Alviso UPRR Bridge. When flows reach 14,000 cfs at the Alviso UPRR Bridge, approximately 5,500 cfs

flows into the salt evaporation ponds. Floodflows are limited to approximately 8,500 cfs in Alviso Slough. The existing channel capacity of the lower Guadalupe River at the Highway 237 bridge will remain at approximately 14,000 cfs until the Lower Guadalupe River Project has been completed. In addition, the lower Guadalupe River/Alviso Slough area will not experience a change in floodflow frequency, duration, or magnitude from existing conditions because the channel capacities in the lower Guadalupe River/Alviso Slough area will remain the same until the Lower Guadalupe River Project has been completed. With completion of the Lower Guadalupe River Project, the flows at the Highway 237 bridge during the 100-year design flood event would be expected to range from 17,000 to 20,000 cfs, depending on the amount of floodwater pumped into the lower Guadalupe River from adjacent storm drains (Section 6.2.1.9, "Stormwater Pump Installations").

Because of the reduced capacity of the lower Guadalupe River, the potential for flooding between I-880 and the Alviso UPRR Bridge would increase if the Guadalupe River Project with Bypass System Alternative were to be operated without the flood protection provided by a flood protection project in the lower Guadalupe River. Therefore, the entire Guadalupe River Project with Bypass System Alternative would not be made operational until the Lower Guadalupe River Project has been completed. As described in Section 3.4.4, "Operation and Maintenance," all bypasses will remain closed with bulkheads and the flood training walls in Segment 3C will remain unfinished until the Lower Guadalupe River Project is operational. Therefore, any potential cumulative effects of the Guadalupe River Project with Bypass System Alternative will not occur until the Lower Guadalupe River Project is operational.

6.2.1.9 Stormwater Pump Installations

The cities of San Jose and Santa Clara and Caltrans have installed or will install stormwater pumps with outlets in the vicinity of or downstream from Highway 101. It is estimated that the stormwater pumps would contribute up to 3,000 cfs to the Guadalupe River during rainfall events. The proposed new stormwater discharge facilities would be designed and operated to ensure that the discharges comply with State water quality objectives. The SCVURPP is a coalition of 15 local agencies that are co-permittees for the NPDES permit for municipal stormwater drainage systems in the Santa Clara Valley. The NPDES permit requires that member agencies reduce the discharge of pollutants to the maximum extent practicable. Measures used by the SCVURPP to minimize or prevent pollutant discharges include management practices, control techniques, system design, engineering methods, and other means appropriate for the control of such pollutants. The goal of the NPDES permit is to ensure that stormwater discharges do not violate State water quality objectives or impair beneficial uses of the receiving waters.

The operation of the stormwater pumps is likely to require an amendment to SCVURPP's NPDES permit and associated waste discharge requirements to include the new points of discharge. Other provisions may be required for the new discharges, including a specific design for trash removal at the pump stations, use of oil-water separators, sediment control structures, and long-term annual monitoring of wet-weather discharges to evaluate performance and compliance with permit conditions.

6.2.1.10 Virginia Street Bank Stabilization Project

SCVWD Virginia Street bank stabilization project, completed in 1997, involved stabilizing and protecting approximately 150 feet of eroded bank along the eastern side of the

Guadalupe River, downstream from Virginia Street. The site is located upstream from Segment 3C of the Guadalupe River Project in a residential neighborhood. The purpose of the project was to stabilize the streambank, preventing further erosion and undermining of the adjacent roadway, McClellan Avenue. The work consisted of repairing the failing bank and placing approximately 240 cubic yards of soil and 280 cubic yards of rock riprap slope protection along the bank. Voids in the rock riprap were filled with soil and planted with live cuttings of native species. In order to accomplish the proposed work, a temporary dirt access road was constructed, and the site was dewatered prior to construction. No impacts on riparian vegetation or jurisdictional wetlands occurred with the project. After high floodflows in 1998, the area was repaired under emergency conditions. (Reiller, pers. comm.).

6.2.1.11 Santa Clara Valley Water District Stream Maintenance Program

SCVWD Stream Maintenance Program will provide long-term guidance to SCVWD to effectively implement routine stream maintenance projects in a cost-effective and environmentally sensitive manner. The Stream Maintenance Program report (Santa Clara Valley Water District, 2000), issued in August 2000, is a process and policy document that will be adopted by SCVWD and used in obtaining long-term permits for routine stream maintenance activities. The Stream Maintenance Program addresses all routine stream maintenance activities, such as sediment removal, vegetation management, and bank protection, within SCVWD's jurisdiction. Approximately 829 miles of streams and 41 miles of canals are under SCVWD's jurisdiction in the Santa Clara Basin and the Pajaro River Basin. The Stream Maintenance Program report documents the results of extensive collaboration with Stream Maintenance Program external stakeholders. A Program EIR for the Stream Maintenance Program is expected to be issued in 2001. SCVWD Stream Maintenance Program is not yet an approved program, and it will not be implemented until after the Program EIR and a Endangered Species Act compliance have been completed and all necessary permits obtained.

The Stream Maintenance Program report estimates that proposed future sediment removal and vegetation management activities could affect approximately 76 acres of riparian vegetation (including native and nonnative species), 100 acres of nontidal wetlands, and 30 acres of tidal wetlands. Proposed mitigation for potential adverse environmental effects associated with the Stream Maintenance Program has three components: (1) policies, implementation measures, and BMPs organized by type of activity and designed to avoid and minimize impacts; (2) compensatory mitigation through restoration and preservation; and (3) mitigation for potential impacts on sensitive species. A proposed compensatory mitigation package for significant residual impacts of the Stream Maintenance Program includes: (1) watershed and habitat protection through preservation of existing high-quality habitat, primarily in upper watershed areas; (2) restoration of riparian habitat through exotic pest plant removal and riparian re-vegetation, primarily in mid-watershed areas; (3) restoration and protection of tidal wetlands in the lower watershed, and (4) creation of nontidal wetlands (Santa Clara Valley Water District, 2000).

6.2.1.12 Alviso Ring Levee Wetland Mitigation and Restoration Project

The Alviso Ring Levee Wetland Mitigation and Restoration Project, conducted by the City of San Jose Public Works Department, is located near the community of Alviso along the southern edge of the South San Francisco Bay, adjacent to the New Chicago Marsh and

between Alviso Slough and Artesian Slough. The project, completed in 1997, involves the creation of 6.93 acres of seasonal wetlands on three sites and the restoration of 3.14 acres of former wetlands on four sites. The objective of the mitigation and restoration project was to create seasonal wetlands to replace the functions, values, and losses over time of the 3.14 acres of seasonal wetlands covered by the placement of the ring levee. Construction activities included removing illegal fill and debris as necessary, removing a levee at the largest of the mitigation sites to allow introduction of water from an adjacent salt marsh, grading and filling to achieve ground elevations appropriate for establishment of marsh habitat, and planting with native seeds and root cuttings to establish desired vegetation. (Lee, pers. comm.)

6.2.1.13 Almaden Quicksilver County Park Project

The Almaden Quicksilver County Park, located between Alamitos and Guadalupe Creeks, is a 3,984-acre undeveloped park southeast of Los Gatos on the northeast ridge of the Santa Cruz Mountains. The park supports limited public use, primarily horseback riding and hiking. The Santa Clara County Parks and Recreation Department purchased most of the park in 1973 and 1975, and there was an additional purchase in 1993. A Trails Master Plan was completed in 1998 (County of Santa Clara, 1998b) and is being implemented. The Trails Master Plan includes improvements to approximately 30 miles of existing trails and construction or realignment of approximately 2 miles of trails. No impacts on riparian vegetation or wetlands are expected with the project (County of Santa Clara, 1998a, Mark, pers. comm.).

The park is Santa Clara County's second largest park and has been designated as a historical park. Much of the park's historical significance stems from cinnabar (mercury sulfide) mining from the mid-1800s until 1976. Historical mining activities in some parts of the park have resulted in elevated concentrations of mercury in mine waste materials. Hazardous waste clean up activities at the Almaden Quicksilver County Park have been actively pursued by the DTSC. Five "hot spots" required remediation: the Hacienda Furnace Yard, the Mine Hill area, the Enriquita Mine Retort, the San Mateo Mine Retort, and the Senador Mine Retort. DTSC announced its certification of the Almaden Quicksilver County Park in February 2000. Certification indicates that all appropriate onsite removal and remedial actions have been completed. Remedial work included site containment and stabilization through placement of vegetated soil covers and streambank stabilization. However, mercury from the mines has migrated down the watershed; cleanup activities were limited to the mine site.

6.2.1.14 Boston Property Project

The proposed Boston Property Project involves construction of three 19-story office buildings containing office space and parking as well as outdoor café areas on a 3.7-acre site in downtown San Jose, west of the convention center between Woz Way and San Carlos Street and between the Guadalupe River and Almaden Boulevard. The three-phase Class A office development totals 863,186 rentable sf and approximately 2,170 parking spaces. There would be six levels of parking above grade and 3 levels below grade for each building. Building 1, which would be located at the southern end of the site, would be approximately 277 feet high and include 349,260 gross sf of office space and 360,231 sf of parking (893 spaces). Building 2, which would be located in the middle of the site, would be approximately 256 feet high and include approximately 371,749 gross sf of office space and

212,721 sf of parking (614 spaces). Building 3, which would be located at the north end of the project site, would be approximately 230 feet high and include approximately 320,713 gross sf of office space and 255,765 sf of parking (663 spaces). (Burton, pers. comm.).

An addendum to the Downtown Strategic Plan Programmatic EIR that addresses the proposed Boston Property Project is expected to be completed in late 2000. The proposed buildings would be set back from the edge of the existing riparian corridor and riverwalk trail along the Guadalupe River by as much as 70 feet in some areas and 5 to 25 feet in other areas. The café elements would be 0 to 15 feet from the riparian corridor. The project would likely result in increased human disturbance of the riparian corridor. The buildings, depending on their design and lighting, could result in an increase in bird injury or death caused by collisions with windows. The proposed project could result in decreased value of the adjacent riparian corridor to wildlife, particularly birds. (Stephens, pers. comm.).

6.2.1.15 John P. McEnery Park Site Improvements

The John P. McEnery Park is located immediately east of the Guadalupe River on the south side of San Fernando Street and 310 feet west of Almaden Boulevard. The San Jose Redevelopment Agency's improvement project at the park involves redesigning and renovating the park for families and children. The existing tennis courts are being removed and replaced with a water fountain and water channel play area, restrooms, picnic tables, and children's play equipment and lawn. No impacts on riparian vegetation or wetlands will occur with the project. The central element of the park is the fountain and water channel, which serve both to educate visitors about the natural history of rivers and provide water play opportunities for children. The improvements are currently under construction and are expected to be completed in December 2000.

6.2.1.16 Los Gatos Creek Trail Project, Phase IIA.A

The City of San Jose's Los Gatos Creek Trail Project, Phase IIA.A, was completed in 1998. The project included construction of approximately 3,500 lf of trail between Willow Street and Meridian Avenue and installation of a prefabricated arched pedestrian/bicycle bridge that spans Los Gatos Creek immediately downstream from Leigh Avenue Bridge. The trail will be constructed along the top-of-bank of Los Gatos Creek; the majority of the trail will be on existing maintenance roads. A total of 0.25 acre of riparian vegetation was affected, and 0.62 acre of riparian vegetation was planted as mitigation. No impacts on wetlands occurred.

6.2.1.17 Vasona Light Rail Extension

The Vasona Light Rail Extension project is the construction and operation of an extension of the existing Light Rail Transit System in Santa Clara County. The Lead Agency for the project is the Santa Clara Valley Transit Authority. The project would provide light rail transit service to the Vasona Corridor, which extends approximately 11 miles from downtown San Jose, beginning at the intersection of West San Carlos Street and Woz Way, to Los Gatos. The project would provide a direct connection to existing commuter rail service and the San Jose Arena. Impacts of the proposed project were evaluated in a joint EIS/EIR, which indicated that the project would result in significant adverse impacts on public safety, noise, land use, vegetation and wildlife and water quality. Impacts on public safety and noise would occur as a result of operation of the light rail extension. Construction of the project would impact 0.41 acres of wetlands, 0.23 acres of riparian

habitat, and up to 187 mature trees. Water quality in Los Gatos Creek could be affected during construction. The EIS/EIR indicated that all significant adverse impacts would be reduced to a less than significant level by implementing appropriate mitigation measures.

6.2.1.18 CORE Location Project

The CORE Location Project is a development project in downtown San Jose. The project site is bounded by the UPRR No 4 track on the south and west, the UPRR rail yard on the north and the Guadalupe River riparian corridor on the east. The project site consists of existing warehouses, storage areas, parking lots, and loading zones. An existing buffer zone ranging from 35 to 105 feet separates the existing warehouses from the riparian corridor. The buffer zone is bare soil. The planned project is to demolish the existing structures and construct two buildings that will house data facilities. The buildings will be two stories tall and have a combined size of 400,000 sf.

An assessment of the biotic resources of the project site and potential impacts on the riparian corridor was conducted in October 2000. The assessment indicated that vegetation within the proposed construction areas are limited to scattered small trees and shrubs. The assessment concluded that construction of the proposed buildings would not directly affect the Guadalupe River riparian corridor because the buildings would be located outside of the required 100-foot wide riparian setback. Temporary impacts on wildlife associated with the riparian corridor may occur as a result of noise and other disturbances during construction.

6.2.1.19 Related Projects in the Guadalupe River Watershed

Additional projects, described below, are under consideration for implementation in the Guadalupe River watershed. Quantitative impacts of these projects are not known at this time because the projects are not yet fully defined. However, it is important to understand the relationship between these projects and the Guadalupe River Project with Bypass System Alternative.

Automated People Mover at San Jose International Airport. An automated people mover, possibly like a monorail, is proposed to be constructed to connect the airport with the light rail station on North First Street. Two potential Guadalupe River crossings are under consideration, one approximately 800 feet downstream from the proposed two-lane access bridge to the rental car garage and another between Skyport Bridge and Airport Parkway. Construction is planned for 2002 to 2007. Environmental compliance has not been initiated for the project, but impacts are expected to be minimal because the people mover will be narrow and elevated (Hessler, pers. comm.).

Santa Clara Valley Water District Instream Recharge Program. SCVWD Instream Recharge Program involves the placement of instream spreader dams to percolate surface water into the channel and thereby replenish the groundwater basin. The Instream Recharge Program consisted of 50 project sites distributed throughout Santa Clara County. On the Guadalupe River system, sites are located on Guadalupe Creek, the upper Guadalupe River, and Los Gatos Creek. The CWA Section 404 permit that governed SCVWD's use of gravel dams for instream recharge expired in 1994, and the San Francisco Bay RWQCB indicated to SCVWD that CEQA compliance would be required before new permits could be issued. In March 1995, SCVWD released a draft EIR for a proposed Instream Recharge Program that would continue activities associated with the installation and operation of as many as 44 spreader dams providing 34,000 af of artificial groundwater recharge annually, or 23 percent of

SCVWD's artificial recharge capacity. The Instream Recharge Program is currently under review by SCVWD. The program that will be proposed as a result of this reconsideration is not known at this time. However, SCVWD has committed to cease operation of instream spreader dams in Guadalupe Creek.

City of San Jose Riparian Corridor Policy Study. The City of San Jose Riparian Corridor Policy Study provides policy and development guidelines for riparian areas along all creeks in the City of San Jose and could therefore affect the Guadalupe River watershed. The study defines the riparian corridor and provides development guidelines for setbacks, access control, landscaping, lighting, and compatible land uses. The City is reviewing the Riparian Corridor Policy Study and may propose its adoption in the future. Adoption and implementation of riparian corridor development guidelines could help to reduce the severity of cumulative impacts in the Guadalupe River watershed.

Fisheries and Aquatic Habitat Collaborative Effort (FAHCE). The Guadalupe River, Coyote Creek, and Stevens Creek provide habitat for a variety of aquatic resources, including fall-run chinook salmon and steelhead. Many activities, including water management, urban encroachment, land uses, agricultural use, reclamation, flood protection, and water supply operations by SCVWD, cause concern for the condition of the public trust resources and the quality and availability of instream habitat in the river and creeks. These activities also raise concern about the economic and social impacts of efforts to significantly alter the existing flow regimes of the river and creeks. SCVWD has been named in a complaint filed before the SWRCB for violations of the California Fish and Game Code, the California Water Code, and Public Trust Doctrine related to SCVWD's incremental contribution to the cumulative impacts on chinook salmon and steelhead and their habitat within the river and creeks. The complaint alleges harm to cold water fisheries as a result of consumptive urban and agricultural water uses in Santa Clara County. To address this complaint, the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) has been initiated jointly by SCVWD and CDFG.

The FAHCE will identify factors limiting steelhead and chinook salmon populations in the Guadalupe River, Coyote Creek, and Stevens Creek watersheds. Both flow and nonflow measures will be considered by the FAHCE when addressing the complaint. Participants include SCVWD; CDFG; Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited, as represented by NHI; NMFS; USFWS; and the City. The FAHCE study is expected to be completed in 2001.

Santa Clara Valley Water District Multiple Species Habitat Conservation Plan. SCVWD, in cooperation with USFWS, NMFS, and CDFG, is preparing a Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP addresses SCVWD's activities and responsibilities under the ESA, as amended (16 USC 1531-1544). The MSHCP is expected to be completed in 2001. In preparing the MSHCP, SCVWD is requesting an incidental take permit under Section 10(a) of the ESA to conduct flood protection, water supply, and related activities within SCVWD's operational area. The MSHCP addresses projects, activities, and the process SCVWD will use to evaluate the potential for take of covered species. The MSHCP, including the conservation measures, applies only to SCVWD and its activities. The Guadalupe River is not included in the MSHCP because of the ongoing coordination with USFWS, NMFS, and CDFG regarding projects on the river. Because SCVWD does not regulate land uses in Santa Clara County, the MSHCP does not cover individuals or other agencies in Santa Clara County.

Guadalupe Fisheries Management Plan. The expected goal of SCVWD's Guadalupe Fisheries Management Plan is to develop a comprehensive management plan to preserve, protect, and enhance the fishery and aquatic resources of the Guadalupe River and those tributaries capable of supporting or contributing to these resources. SCVWD intends to prepare and implement the Guadalupe Fisheries Management Plan in the near future.

The expected objectives of the plan are to:

- Provide guidance for fisheries habitat protection and restoration in the Guadalupe River watershed
- Identify actions SCVWD can take to maintain and improve existing habitat for native fish
- Facilitate communication with stakeholders, including environmental organizations, the public, and regulatory/resource agencies
- Provide a focus for SCVWD's BMPs, program and project coordination, and budgeting for the Guadalupe River watershed
- Provide a coordinated effort to protect and mitigate impacts on fishery resources associated with construction projects, operations, and maintenance tasks
- Encourage innovative solutions for improving aquatic habitat
- Act as a catalyst for native fish enhancement efforts in South Bay streams

Los Capitancillos Freshwater Wetland Mitigation Site Development Project. The Los Capitancillos Freshwater Wetland Mitigation Site Development Project is proposed on SCVWD-owned property adjacent to the Guadalupe Creek Restoration Project site near Masson Dam. SCVWD is proposing to implement a wetland mitigation project that would include the construction of a 5-acre seasonal freshwater wetland. The wetland will provide habitat for common seasonal freshwater plants and associated vertebrate and invertebrate species. SCVWD-owned parcel is currently a relatively flat, open, weedy field. The schematic design phase of the project is scheduled to be completed by fall 2000. The engineers' report and the environmental documents for this project are scheduled to be completed by fall 2001.

The preliminary design concept for the project consists of a series of interconnected wetland basins, including an upland sedimentation area. Water will flow into the southwest end of the wetland from SCVWD's Almaden Valley pipeline. No surface water from the wetland mitigation site will flow into Guadalupe Creek under the existing conceptual plan. Because the site is located in a residential area, it is anticipated that the final design will include passive recreational features, such as a pedestrian walkway, wildlife viewing areas, and interpretive signs, as well as vegetation barriers or fences.

San Jose Downtown Strategy Plan. In 1992, the City of San Jose prepared an EIR on the San Jose Downtown Strategy Plan and supplemented the original EIR in 1998. The EIR evaluates the impacts of implementing a plan for development of the central business district of San Jose. The study includes the central business district and adjacent area encompassing approximately 780 acres, including a portion of Guadalupe River Project. The focus of the EIR is on describing impacts on transportation and traffic, noise, public services, and

cultural resources. The EIR does not quantify impacts on vegetation and wildlife, but indicates that impacts on these resources will be evaluated when specific projects are proposed. Because of the programmatic nature of the EIR and because specific projects are not discussed and effects are not quantified, information has not been incorporated into the cumulative impact analysis of this EIR/SEIS.

6.2.2 Cumulative Impacts on Hydrologic and Hydraulic Conditions

The following section focuses on the cumulative impacts of major projects in the Guadalupe River watershed on the hydraulic properties of the Guadalupe River under the prevailing hydrologic conditions. Section 4.1, "Hydrologic and Hydraulic Conditions," discusses the existing hydrology and hydraulic properties of the Guadalupe River watershed. The cumulative impacts discussed in this section are based on the qualitative and quantitative analysis of both the Guadalupe River Project with Bypass System Alternative and other major projects in the watershed. The principal reports containing data pertaining to hydraulic properties and hydrologic conditions include the 1977 Hydrology Study (U.S. Army Corps of Engineers, 1977), the 1991 GDM and 1993 revised GDM reports for the Guadalupe River Project (U.S. Army Corps of Engineers, 1991b), and the Upper Guadalupe River Watershed Study Engineers' Report (Santa Clara Valley Water District, 1997).

This section first describes the existing channel capacity of the Guadalupe River. This description provides a baseline from which to assess the cumulative impacts of major projects in the Guadalupe River watershed. The cumulative impacts of these projects on flood protection are then evaluated, followed by an assessment of the potential impacts on hydraulic properties and hydrologic conditions in the watershed.

6.2.2.1 Existing Channel Capacity of the Guadalupe River

The existing channel capacities in Los Gatos Creek and along the Guadalupe River in the downtown San Jose area and downstream from I-280 are depicted in Figure 6.2-1. Without the construction of the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative, the capacity of the channel upstream from I-280 and upstream from Los Gatos Creek is limited to 9,100 cfs. Likewise, without the construction of the Guadalupe River Project with Bypass System Alternative, the capacity of the channel below the confluence with Los Gatos Creek at St. John Street is limited to 7,800 cfs. However, the projected 100-year peak flow upstream from I-280 is 14,600 cfs. Consequently, flows greater than 7,800 cfs would break out of the channel upstream from and in the vicinity of St. John Street during a 100-year peak flow event. Flows greater than 9,100 cfs would break out upstream and downstream from I-280 in the downtown San Jose area. Because the flood protection components of Segments 1 and 2 of the Authorized Project have been completed, the channel capacity at the downstream end of the project upstream from I-880 is 17,000 cfs. Depending on where and when flows that break out of the channel return to the Guadalupe River, flows at I-880 can be greater than 7,800 cfs under existing conditions. During the flood of 1995, flows at I-880 were estimated to reach 11,000 cfs.

The lower Guadalupe River downstream from I-880 to Highway 101 has a capacity of 17,000 cfs. Between Highway 101 and the Highway 237 bridge, the river has a channel capacity of approximately 14,000 cfs (Figure 6.2-1). The channel capacity in this part of the river serves to limit the peak floodflows that can be conveyed in the lower Guadalupe River. Under existing conditions, flows greater than 14,000 cfs would break out of the channel along the

lower Guadalupe River upstream from the Highway 237 bridge. In addition, if flows from the downtown area were to exceed 14,000 cfs, the existing channel capacity of approximately 14,000 cfs at the Highway 237 bridge would limit the floodflows in Alviso Slough to 14,000 cfs.

6.2.2.2 Flood Protection – Guadalupe River Watershed

Completion of the Upper Guadalupe River Project would result in flood protection for the 100–year design floodflow of 14,600 cfs upstream from I-280. The Guadalupe River Project with Bypass System Alternative has been designed to accommodate the 100-year design floodflow of 14,600 cfs on the Guadalupe River from I-280 to Los Gatos Creek. Downstream from the Guadalupe River's confluence with Los Gatos Creek, the Guadalupe River Project with Bypass System Alternative has been designed to accommodate the 100-year design floodflow of 17,000 cfs (Figure 6.2-2). As discussed in Section 6.2.1.8, "Lower Guadalupe River Flood Protection Project," the design of the downtown Guadalupe River Project with Proposed Action assumed a capacity of 17,000 cfs in the lower Guadalupe River between I-880 and San Francisco Bay.

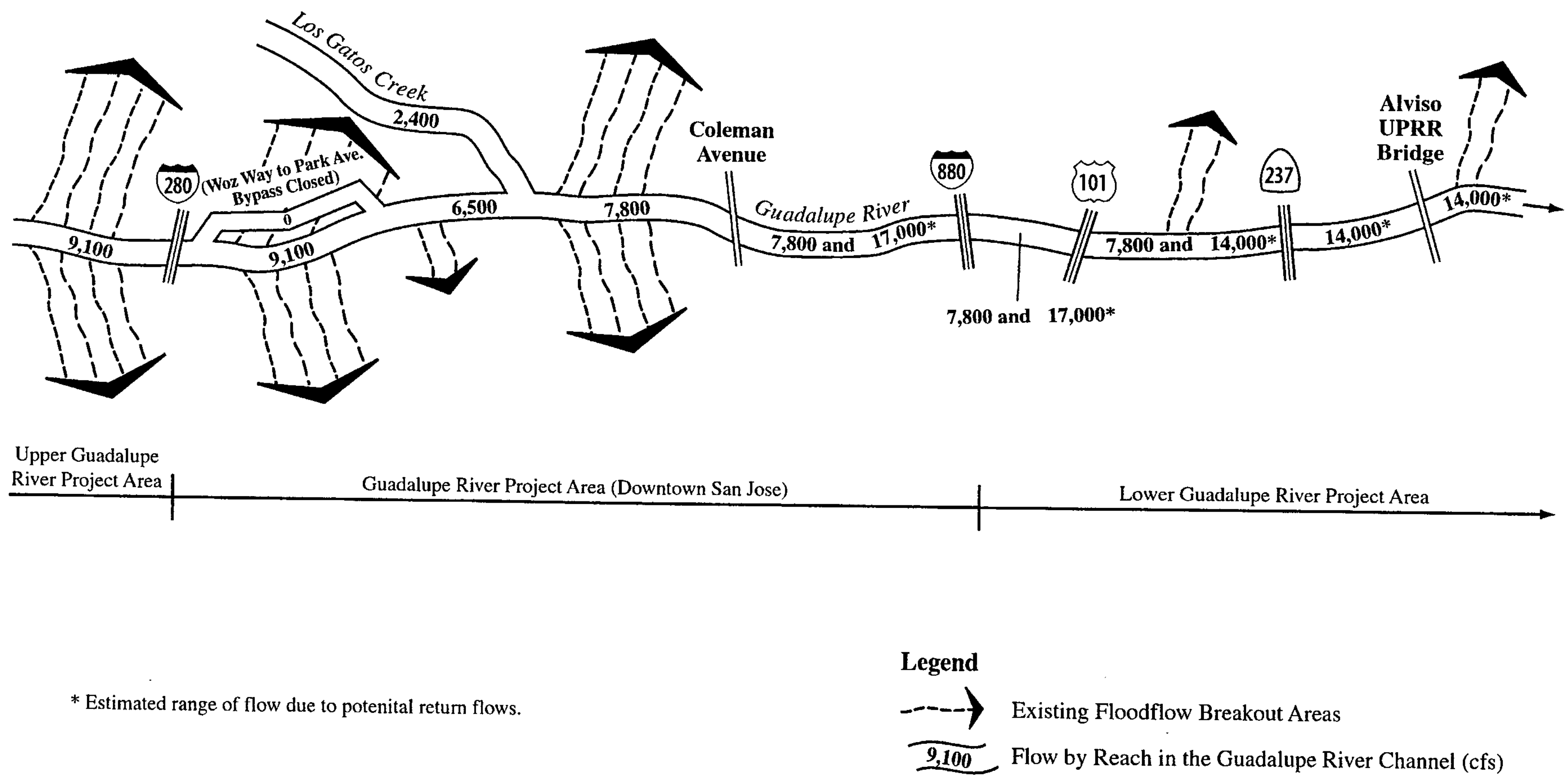
Completion of the Upper Guadalupe River Project, the Guadalupe River Project with Bypass System Alternative, and the Lower Guadalupe River Project would provide for conveyance of the 100-year design floodflow. Figure 6.2-3 depicts the flows in the Guadalupe River channel at the peak of the design flood under cumulative conditions when all three flood protection projects are operational. With completion of the Upper and Lower Guadalupe River Projects and the Guadalupe River Project with Bypass System Alternative, flows at the Alviso UPRR Bridge are expected to be 17,000 to 20,000 cfs under the 100-year design floodflow.

The total floodflow rate downstream from Highway 101 with completion of the Upper and Lower Guadalupe River Projects and the Guadalupe River Project with Bypass System Alternative is not precisely known because it is anticipated that some of the additional channel capacity would be used for conveyance of local stormwater. Up to 3,000 cfs of local stormwater could be pumped from lands adjacent to the Guadalupe River in the area between Highway 101 and the Alviso UPRR Bridge. The Lower Guadalupe River Project will be designed to convey up to 20,000 cfs to accommodate the potential stormwater pumping.

6.2.2.3 Hydrologic and Hydraulic Conditions

As discussed in Section 5.1, "Hydrologic and Hydraulic Consequences," hydraulic conditions such as depth and velocity would change in the natural Guadalupe River channel following completion of the Upper Guadalupe River Project and Guadalupe River Project with Bypass System Alternative.

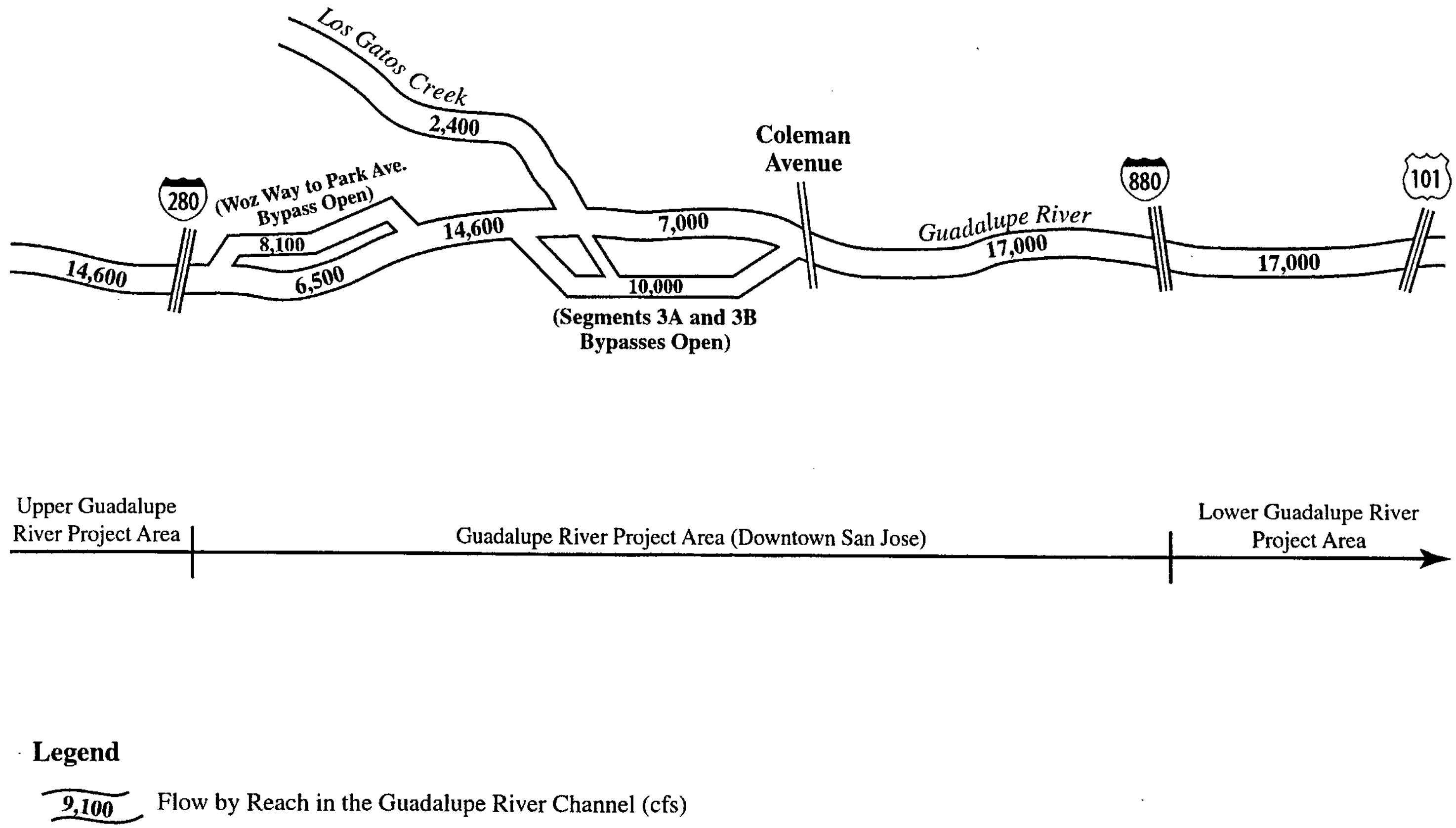
A key hydraulic design feature of the bypass systems proposed for the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative is that they start operating only when the flows in the river exceed approximately 1,500 cfs. The channel maintenance flows, which are approximately 1,200 cfs, would therefore remain in the river. As described in Section 5.2, "River Geomorphology," and Section 5.6, "Biological Resources – Fish," channel maintenance flows are important in maintaining sediment transport continuity that in turn affects maintenance requirements and aquatic habitat features.



Source: 100-year design floodflow is based on U.S. Army Corps of Engineers (1993).

Figure 6.2-1. Existing Flows in the Guadalupe River at the Peak of the 100-Year Design Floodflow

Existing conditions include completion of Segments 1 and 2 and Segment 3C Phase 1. The Woz Way to Park Avenue Bypass is closed. Floodflows break out upstream and downstream from I-280, downstream from Los Gatos Creek, downstream from Highway 101, and downstream from the Alviso UPRR Bridge.



Source: 100-year design floodflow is based on U.S. Army Corps of Engineers (1993).

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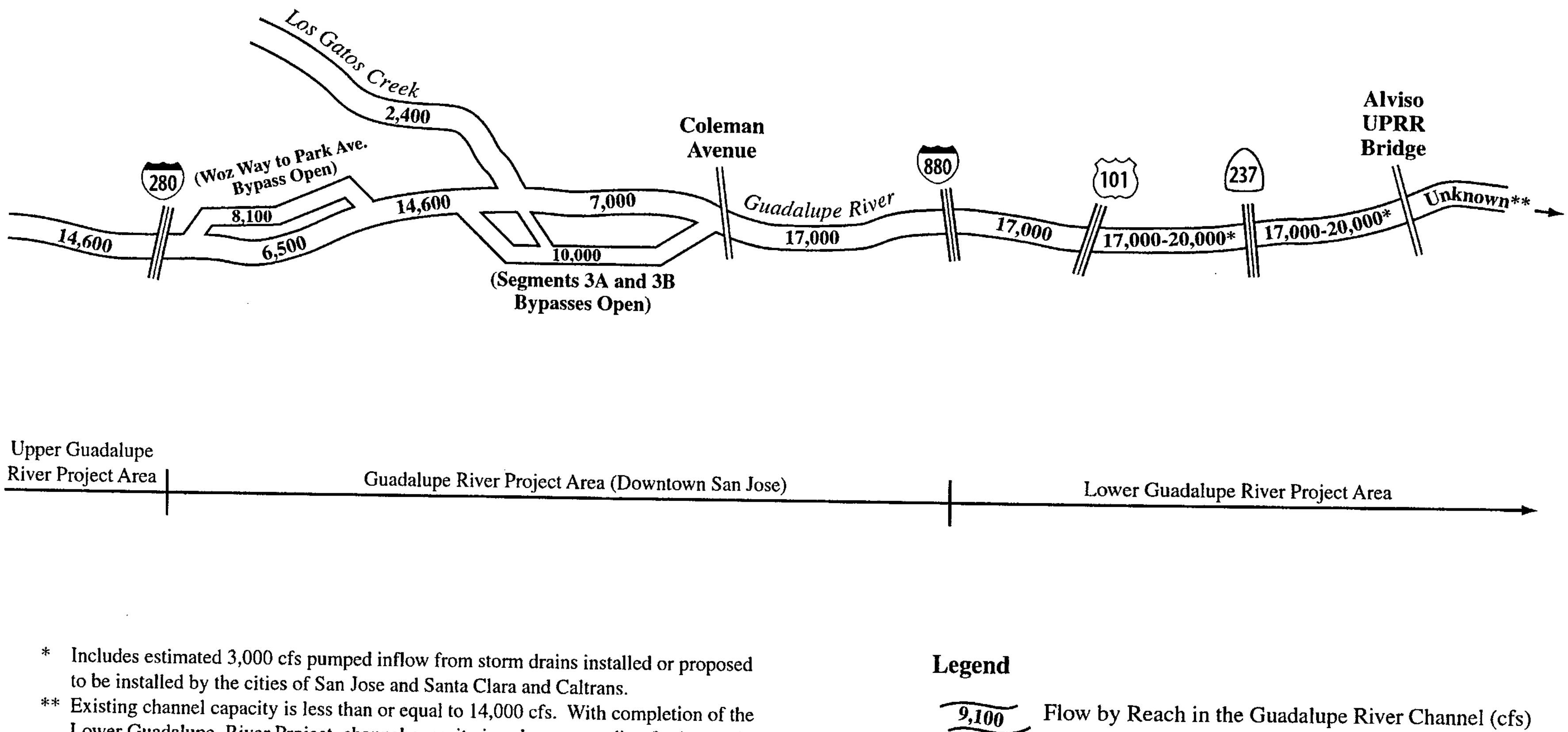
Figure 6.2-2. Flows in the Guadalupe River at the Peak of the 100-Year Design Floodflow for the Bypass System Alternative and Refined Bypass System Alternative

The Bypass System Alternative and Refined Bypass System Alternative include completion of Segment 3. Segments 1 and 2 are already completed. The Woz Way to Park Avenue Bypass is operational. The bypasses in Segments 3A and 3B are operational. With completion of the Bypass System Alternative or the Refined Bypass System Alternative and operation of the bypasses, floodflows remain in the Guadalupe River channel.



* Includes estimated 3,000 cfs pumped inflow from storm drains installed or proposed to be installed by the cities of San Jose and Santa Clara and Caltrans.

** Existing channel capacity is less than or equal to 14,000 cfs. With completion of the Lower Guadalupe River Project, channel capacity is unknown pending further evaluation of alternatives.

Source: 100-year design floodflow is based on U.S. Army Corps of Engineers (1993).

Figure 6.2-3. Flows on the Guadalupe River at the Peak of the 100-Year Design Floodflow – Cumulative Conditions

It is assumed that the Upper Guadalupe River Project, Guadalupe River Project with Proposed Action, and Lower Guadalupe River Project are all constructed and operational. Design flood flows would not break out between I-280 and Highway 101 or between Highway 101 and the Alviso-UPRR Bridge.

The potential changes in flow depth and velocity in the Lower Guadalupe River Project area are not known because the design has not been determined and any changes in flow would depend on the features of the project, such as bypasses and other channel modifications. If bypasses are included in the Lower Guadalupe River Project, similar design considerations for maintaining channel maintenance flows in the river would be implemented.

When the river is flowing at or below the channel maintenance flow and the bypasses are not operating, the velocities in the natural channel will be unaffected in all areas except where armoring is instituted in the channel bed (Table 5.1-2). Velocities would be expected to be slightly greater in armored areas than under existing conditions due to reduced channel roughness.

When floodflows exceed the channel maintenance flows and some of the flow is conveyed by the bypass systems of the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative, velocities in the natural channel may increase or decrease depending on specific hydraulic characteristics of a particular channel segment and the downstream channel segments (Table 5.1-2). Under the 2-year design flood, mean channel velocities would decrease with implementation of the flood protection projects. Under high flow conditions (20-year and greater floods), preliminary analysis indicates that velocities would decrease in bypassed segments compared to existing conditions but increase in armored sections (Section 5.1, "Hydrologic and Hydraulic Consequences"). Overall, velocities during high flows will be greater than under existing conditions because floodflows will remain in the river with completion of the flood protection projects.

Until the design of the Lower Guadalupe River Project is determined, the effects of projects described in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses," on velocities in the lower Guadalupe River cannot be specified. Potential impacts will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project. See Section 6.2.3, "Cumulative Impacts on River Geomorphology," and Section 6.2.7, "Cumulative Impacts on Biological Resources – Fish," for discussion of the potential effects of changes in flow velocity on river geomorphology and fish.

Potential changes in the volume of freshwater entering the South Bay are a concern because conversion of salt marsh is associated with changes in South Bay salinity levels; freshwater inflows may reduce salinity levels. However, the total volume of flow discharged to the South Bay during any flood would not change appreciably with completion of the major projects in the Guadalupe River watershed. The time it would take for the total volume of floodflows to reach the South Bay could be shorter than under existing conditions because flows would be contained in the channel instead of flooding adjacent areas. However, there may be little or no reduction in the overall time it takes for floodflows to reach the South Bay if the Lower Guadalupe River Project includes levee setbacks, offstream storage, floodplain terrace, or a combination of these alternatives. If floodwalls were constructed on the existing levees in the Lower Guadalupe River Project area, the total volume of floodflows might reach the South Bay hours or a day earlier than under existing conditions, which would not be a substantial change. Because only a slight change in the time of delivery would occur and because flooding is infrequent, little or no adverse effect as a result of any change to the freshwater load to the South Bay would be expected with completion of the flood protection projects in the Guadalupe River watershed. This cumulative impact is therefore considered to be less than significant. The Lower Guadalupe River Project EIR/EIS and BA will address the potential direct, indirect, and cumulative

impacts of each alternative on hydrologic and hydraulic conditions in the Guadalupe River, including the Alviso Slough area. The environmental document for the Lower Guadalupe River Project will also address the cumulative impacts of all projects in the Guadalupe River watershed, including the Guadalupe River Project with Bypass System Alternative.

See Section 6.2.6, "Cumulative Impacts on Biological Resources – Wildlife," for additional discussion of the effects on listed species if a cumulative hydrologic or hydraulic impact is identified in the BA for the Lower Guadalupe River Project.

6.2.3 Cumulative Impacts on River Geomorphology

The assessment of potential cumulative impacts of projects in the Guadalupe River watershed on channel erosion and deposition and river morphology is based primarily on the following reports:

- Sediment Transport Modeling Study of the Upper Guadalupe River – Phase 2 (Philip Williams & Associates, 1996)
- General Design Memorandum, Guadalupe River, California (U.S. Army Corps of Engineers, 1991b)
- Guadalupe River, California General Design Memorandum, Revised (U.S. Army Corps of Engineers, 1993)
- Guadalupe River Bypass, Hydraulic Analyses (Northwest Hydraulic Consultants, 1999)
- Lower Guadalupe River Sedimentation Study (Northwest Hydraulic Consultants, 2000)

6.2.3.1 Construction Impacts

Channel Erosion and Deposition. All the projects in the area have or will have the potential to contribute to erosion and increased sedimentation in the Guadalupe River during their construction. However, these projects have implemented or will implement construction-period erosion-control programs. Therefore, no significant cumulative impacts are expected during construction.

River Morphology. Construction of the flood protection projects have or will have features that locally affect the channel form: the pattern of pools, runs, and riffles. The features include invert stabilization structures, energy dissipaters, weirs, channel bed armoring, low-flow channels, and other armor features. Some of these features will result in a narrower low-flow channel that has higher velocities than the existing channel. These features would not alter the sediment load and are limited in length with respect to the river as a whole; therefore, no significant cumulative impacts on river morphology are expected as a result of construction of the flood protection projects. Changes in channel form, however, may change the suitability of the affected channel reaches for aquatic species. Cumulative impacts on aquatic species are discussed in Section 6.2.7, "Cumulative Impacts on Fish."

6.2.3.2 Operational Impacts

Channel Erosion and Deposition. The Lower Guadalupe River Sedimentation Study (Northwest Hydraulic Consultants, 2000) evaluated sediment load and sediment transport within the Guadalupe River watershed. This preliminary planning level study considers the sediment load and transport with all of the flood protection projects in place and

operational. Under all flood scenarios, the wash load (fine sediments) passes through the river to San Francisco Bay unaffected by operation of the flood protection projects.

Under all flood conditions, more than 92 percent of the bedload sediment settles out between Trimble Road and Montague Expressway in the Lower Guadalupe River Project area (Northwest Hydraulic Consultants, 2000). This result is similar to existing conditions. The cumulative impact of all the flood protection projects in the Guadalupe River watershed is to continue the sediment transfer capability of the higher gradient reaches of the river, upstream from I-880, by confining all floodflows to the channel (Northwest Hydraulic Consultants, 2000). The bedload will settle out in the lower gradient reaches of the river between Trimble Road and Montague Expressway. The sedimentation study indicates that approximately 5 percent of the bedload settles in the reach between Montague Expressway and the Alviso UPRR Bridge. The study area did not extend downstream from the Alviso UPRR Bridge so the fate of the remaining 5 percent+ of bedload is not known. The analysis demonstrates that on a watershed basis, the transport of the bedload would not be affected by project operations.

Localized areas of channel erosion and deposition in the affected reaches of the river may change in response to the magnitude and duration of a flood. The Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project are expected to reduce channel erosion in the bypassed sections of the natural river channel during higher floodflows because the bypasses in both project areas will reduce the maximum flow in the natural channel (Section 6.2.2.3, "Hydrologic and Hydraulic Conditions"). In addition, the invert stabilization structures proposed for the Guadalupe River Project with Bypass System Alternative in the natural channel in Segments 3A and 3B and in Segment 1 and 2, if needed, will improve channel-bottom stability, reduce incision, and encourage the development of plunge pools and gravel-bar sequences in the channel.

To reduce the potential for adverse impacts on the channel form from erosion and deposition, the Corps will continue to refine movable bed modeling (HEC-6) during the design phase of the Guadalupe River Project with Bypass System Alternative. In addition, HEC-6 modeling will be conducted during the design phase of the Lower Guadalupe River Project. The HEC-6 modeling will help in the selection and design of appropriate channel features that would, if necessary, protect the channel from erosion. Although a specific alternative has not been selected for the Lower Guadalupe River Project, the selected solution will likely have features to prevent erosion of the natural channel. Based on preliminary planning level analyses of the Guadalupe River (Northwest Hydraulic Consultants, 2000, Santa Clara Valley Water District, 1997a), it is expected that installation of channel features for the Lower Guadalupe River Project, such as invert stabilization structures, rock weirs, or biotechnical bank stabilizers, would be able to avoid or minimize additional areas of channel erosion. Cumulative impacts related to channel erosion and deposition due to projects in the Guadalupe River watershed would be less than significant.

As described in Sections 1.6.15 and 6.2.1.11, "Santa Clara Valley Water District Stream Maintenance Program," SCVWD is developing a Programmatic EIR for its Stream Maintenance Program that will address the potential effects of ongoing channel maintenance on the entire Guadalupe River, including the project area. Continuance of the existing maintenance practices, including bank stabilization and sediment and woody debris removal, are the only regular maintenance activities that would be required for

maintenance of the as-built designs of the river channel specified in the Bypass System Alternative.

River Morphology. Diversion of floodflows into the bypass systems of the Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project would reduce maximum flow in the natural channel. These diversions, however, are expected to have minimal impacts on the magnitude and duration of flows responsible for channel formation. Channel-maintenance and gravel-flushing flows will remain in the natural channel to maintain channel form and gravel quality. The most recent hydrologic data from Stream Gage 23B (Figure 6.1-1), which is upstream from all proposed bypasses, indicate that the channel-maintenance flow (the 1.5-year recurrence interval flow) is approximately 1,200 cfs. This flow is somewhat lower than the proposed minimum flow (1,500 cfs) required to initiate diversion into the bypass channels. Diverting a portion of floodflows that exceed 1,500 cfs to the bypass systems would not affect the frequency or duration of channel maintenance flows in the natural channel. Floodflow diversion would not increase the amount of fine sediment deposited in the natural channel. Consequently, there would be no change in channel maintenance processes for riffles, runs, and pools and transport of the river's sediment load over the long term. Therefore, no significant cumulative impact on river morphology would result from operation of the Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project.

The potential impacts of the Lower Guadalupe River Project on river morphology, such as the pattern of riffle, run, and pool habitats, cannot be determined until specific alternatives are identified and analyzed. Potential adverse impacts of the Lower Guadalupe River Project will be avoided by designing the Lower Guadalupe River Project to maintain the appropriate channel-maintenance and gravel-flushing flows.

Because of the low-flow channel design features, such as invert stabilization structures and rock weirs, incorporated into the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative and the commitment to address erosion and deposition processes in the Lower Guadalupe River Project, no significant cumulative impacts on river morphology are expected as a result of the projects. Any impacts of the Lower Guadalupe River Project on river morphology will be analyzed in the environmental documents for that project. The cumulative impacts of the Lower Guadalupe River Project in association with other past, present, and reasonably foreseeable future projects will also be addressed.

6.2.4 Cumulative Impacts on Water Quality

6.2.4.1 Suspended Solids and Biostimulatory Nutrients

Construction-Related Disturbances. Construction of flood protection components in the Guadalupe River watershed have the potential to cause temporary and intermittent increases in suspended solids or concentrations of biostimulatory nutrients (nitrogen and phosphorus) in the Guadalupe River. Biostimulatory nutrients are primarily associated with fine sediments and particulate organic matter. Construction activities that would disturb channel and streambank sediments may occur simultaneously, causing an increase in turbidity and higher concentrations of suspended solids and biostimulatory nutrients in the water than would result from each individual project.

However, these impacts would not be expected to adversely affect the beneficial uses of the Guadalupe River described in the Basin Plan (Section 4.3, "Water Quality") or result in long-term degradation of water quality in the river because of regulatory requirements that must be followed during construction. Soil-disturbing projects that affect more than 5 acres are required to obtain an NPDES stormwater permit and to implement an associated SWPPP that specifies BMPs for erosion control. In addition, soil-disturbing activities will be conducted in compliance with approved erosion and sediment control, vegetation removal, and mitigation and monitoring plans. The cumulative impacts of suspended solids resulting from the incremental contributions of flood protection and other construction activities in the Guadalupe River watershed are therefore less than significant.

Operation-Related Disturbances. As discussed in Section 6.2.3, "Cumulative Impacts on River Geomorphology," operation and maintenance of the flood protection projects on the Guadalupe River would not cause long-term changes in the transport of wash load sediments in the channel. Wash load is defined as suspended sediments consisting of fine clays, silts, and sands. Wash load sediments are mobilized at relatively low streamflow velocities compared to the velocities required to transport coarser bedload materials. Under cumulative conditions, velocities during high flows are expected to be greater than existing conditions upstream from I-280, through much of the downtown San Jose area, and downstream to San Francisco Bay. Velocities during high flows will be greater than existing conditions because floodflows will remain in the river with completion of the flood protection projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses." However, the lower flow velocities that are responsible for mobilizing fine sediments associated with wash load would not change. Consequently, there would be no water quality impacts associated with wash load sediments as a result of the Guadalupe watershed.

Maintenance activities, such as debris removal, storm drain outlet maintenance, and minor repairs may cause temporary and intermittent disturbances of channel and bank sediments. However, in-channel maintenance activities affecting water quality are likely to be infrequent and are unlikely to be concentrated in any one area of the river. Consequently, long-term operations and maintenance of Guadalupe River flood protection facilities would not be anticipated to adversely affect beneficial uses of the river or result in the degradation of water quality. The cumulative impacts of incremental changes in the transport of wash load sediments would therefore be less than significant.

Regional Water Quality Controls. The City of San Jose is a participant in the Santa Clara Valley Nonpoint Source Pollution Control Program and a co-permittee to the Program's NPDES permit for municipal storm water discharges, issued by the RWQCB. This permit includes requirements for water quality monitoring, identification and elimination of illicit connections and illegal dumping to the stormdrain system, street cleaning, and public education programs. In addition, this permit requires more stringent standards for land use decisions and site design criteria. The City of San Jose's 2020 General Plan (City of San Jose, 1994) includes the following goals and policies that would reduce the potential for impacts on local and regional water quality and mitigate potential water quality impacts on a less-than-significant level:

Natural Resources-Water Resources:

Policy 1. The City, in cooperation with the Santa Clara Valley Water District, should restrict or carefully regulate public and private development in watershed areas, especially those

necessary for the effective functioning of reservoirs, ponds, and streams, and for the prevention of excessive situations.

Policy 3. The City should encourage the Santa Clara Valley Water District to restrict public access and recreational uses on water related lands when water quality could be degraded.

Policy 6. When new development is proposed in areas where storm runoff will be directed into creeks upstream from groundwater recharge facilities, the potential for surface water and groundwater contamination should be assessed and appropriate preventative measures should be recommended.

Policy 7. The City shall require the proper construction and monitoring of facilities storing hazardous materials in order to prevent contamination of surface water, groundwater, and underlying aquifers. In furtherance of this policy, design standards for such facilities should consider high groundwater tables and/or the potential for freshwater or saltwater flooding.

Policy 8. The City should establish nonpoint source pollution control measures and programs to adequately control the discharge of pollutants into the City's storm sewers.

Policy 9. The City should take a proactive role in the implementation of the Santa Clara Valley Nonpoint Source Pollution Control Program, as well as implementation of the City's local nonpoint source control and stormwater management program.

Natural Resources – Bay and Baylands:

Policy 5. The City should continue to participate in the Santa Clara Valley Nonpoint Source Pollution Control Program and take other necessary actions to formulate and meet regional water quality standards which are implemented through National Pollutant Discharge Elimination System permits and other measures.

6.2.4.2 Toxic Contaminants – Accidental Spills of Construction-Related Materials

Accidental spills of construction materials harmful to aquatic organisms, such as concrete, sealants, oil, and other fuels, during construction of projects in the watershed could contribute to cumulative impacts on water quality. Although they would be infrequent and not intentional, accidental spills could occur during construction in stream channels or on the banks of stream channels.

Implementation and enforcement of toxic materials control and spill-response plans are required for major construction projects that receive permits under the NPDES stormwater permit process. As described in Section 3.4.3, "Environmental Commitments," these plans define procedures that must be followed for hazardous material storage and containment and for vehicle and equipment maintenance to avoid and minimize impacts on water quality. The cumulative impacts of toxic contaminants would be less than significant because toxic materials control and spill-response plans would be implemented for major construction projects in the watershed to avoid or control potential accidents.

6.2.4.3 Toxic Constituents – Mercury

As described in Section 1.5.3.1, "Regional and Local Requirements – San Francisco Bay Regional Water Quality Control Board and State Water Resources Control Board," and Section 4.3, "Water Quality," the San Francisco Bay RWQCB recently prepared a draft total maximum daily load (TMDL) program for mercury for San Francisco Bay (San Francisco

Bay Regional Water Quality Control Board, 2000). The program calls for significantly reducing the transport of mercury from the Guadalupe River system to the bay. The San Francisco Bay RWQCB has determined that if the mercury load in the river system could be reduced to pre-Gold Rush era levels, it is highly probable that standards for mercury in the bay would be achieved.

Most of the mercury in the Guadalupe River watershed is bound to sediments and particulates. The sediments of greatest concern are those transported and deposited along the banks of the Guadalupe River when mercury-bearing ore was mined in the upper watershed during the Gold Rush.

Mercury concentrations can vary greatly in sediments from different areas of the Guadalupe River watershed. The potential for adverse environmental effects from sediment-bound mercury in the watershed depends on the source, transport, and deposition characteristics of such mercury.

Complex physical and chemical conditions of the aquatic environment, such as pH, organic carbon, and dissolved oxygen, can affect mercury methylation rates. Methylation of mercury is a significant concern because methylated forms of mercury can be absorbed readily by aquatic organisms, causing toxic reactions and tissue accumulation.

The methylation process depends on environmental conditions, such as pH, dissolved organic carbon, temperature, sulfates, and light. Many of these factors are affected by biological processes, such as growth and decay.

Controlling sediment in the Guadalupe River is crucial for complying with the reduction in mercury levels recommended in the TMDL. Consequently, potential changes in sediment sources and transport characteristics in the Guadalupe River system resulting from projects in the watershed are analyzed in this cumulative impact analysis. Operation of the proposed flood protection projects and the Guadalupe Creek Restoration Project would not change the amount or rate of sediments entering the Guadalupe River from sources such as surface runoff and storm drains. Also, the volume of mercury-bearing sediments entering the Guadalupe River from abandoned mines and other sites in the watershed upstream from the confluence of Guadalupe and Alamitos Creeks occurs independent of the proposed flood protection projects or other projects in the Guadalupe River watershed.

As part of its ongoing maintenance activities, SCVWD periodically would remove bedload sediment that accumulates in the channel between Trimble Road and Montague Expressway. Sediment currently accumulates in this area and will continue to do so regardless of whether the project is constructed. As discussed in Section 6.2.3.2, "Cumulative Impacts – Operational Impacts," sediment transport studies for the Guadalupe River indicate that over 92 percent of the bedload would continue to be deposited between Trimble Road and Montague Expressway after all flood protection projects are operational. Such sediment removal is anticipated to be necessary to maintain channel capacity for conveying flood waters. Removal of sediment containing excessive levels of mercury would be considered beneficial to the overall goal of the San Francisco Bay RWQCB's TMDL program for mercury.

As described in Section 6.2.3.2, "Cumulative Impacts – Operational Impacts," operation of the proposed flood protection projects on the Guadalupe River would cause local changes to existing erosion and sediment deposition patterns. As explained in Section 4.3.2, "Toxic

Constituents," some sediments that would be affected by such changes could contain unacceptable levels of mercury. However, although mercury-bearing sediments have the potential to be transported in either the suspended wash load or the bedload, net erosion caused by peak flow conveyance in the Guadalupe River system is expected to be reduced by implementing the proposed flood protection projects, including invert stabilization structures, bypasses, channel bed and bank armoring, additional vegetative bank cover, and bank management.

The flood protection projects would not affect the source or input of mercury into the system. Therefore, the existing mercury budget for the Guadalupe watershed would not increase because of construction of the projects. As described in Section 3.4.3, "Bypass System Alternative – Environmental Commitments," an erosion and sediment control plan would be implemented for the Guadalupe River Project with Bypass System Alternative to avoid sediment discharges into the river during construction activities. The erosion and sediment control plan would require contractors to:

- conduct all construction work in accordance with site-specific construction plans that minimize the potential for sediment input to the stream
- grade spoil sites to minimize surface erosion and apply erosion control measures as appropriate to prevent sediment from entering water courses or the stream channel, to the extent feasible
- avoid operating equipment in flowing water by using temporary cofferdams or some other suitable diversion to divert channel flow around the channel and bank construction area

In addition, a soil management plan would be implemented for the Guadalupe River Project with Bypass System Alternative that would provide procedures for classifying soils, as well as procedures and criteria for disposal and reuse. Prior to project implementation, the soil management plan will be updated to reflect final project design and to incorporate input from RWQCB regarding management of soils containing elevated mercury concentrations. The updated soil management plan will be submitted to RWQCB for approval prior to implementation.

The following restrictions on soil management would be included in the soil management plan submitted to RWQCB for approval:

- Sediments with mercury concentrations that exceed hazardous waste criteria under federal or state law must be disposed offsite in appropriately licensed disposal sites. The determination of hazardous properties shall comply with all applicable statutes and regulations pertaining to hazardous wastes.
- Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 mg/kg may not be reused onsite unless such soils are placed above the low flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur; above the water surface elevation defined by the 3-year recurrence interval.
- Excavated surfaces above the 3-year recurrence interval elevation that contain mercury concentrations higher than hazardous waste levels will be overexcavated and replaced

with soils meeting the above criteria for onsite reuse. Excavated surfaces below the 3-year recurrence interval elevation which contain mercury concentrations greater than 1 mg/kg will be overexcavated and replaced with clean imported soil.

- The limitations on onsite reuse of excavated soils and sediments would also apply to operation and maintenance activities throughout the life of the proposed project.

The potential for conversion of sediment-bound mercury into soluble methyl mercury exists in any wetland or shallow sediment deposit. Although recent monitoring in Guadalupe Creek found methyl mercury production throughout the restoration project area and upstream within the pore water of the first 2 cm of creek sediment (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 2000b), the formation rate could not be determined based on the limited sampling program conducted. These projects also have the potential to change the future distribution of methyl mercury because projects in the Guadalupe River watershed could slightly alter the ongoing pattern of erosion and sediment deposition (Section 6.2.3.2, "Cumulative Impacts on River Geomorphology – Operational Impacts"), but almost no information exists on the existing transport of sediment - bound mercury, the existing locations of mercury deposition, or the existing rate of methyl mercury formation in the Guadalupe River system (Section 4.3.2, "Toxic Constituents"). The flood protection projects on the Guadalupe River and the Guadalupe Creek Restoration Project are expected to result in the following:

- The projects would not change the amount or rate of sediments entering the Guadalupe River from sources such as surface runoff and storm drains.
- Net erosion caused by peak flow conveyance in the Guadalupe River system is expected to be reduced by implementing the projects.
- The overall rate of erosion and sediment deposition on a watershed scale is not expected to change and may be reduced with the implementation of the projects.

Despite the project benefits outlined above, mercury and the potential for methylation in the Guadalupe River watershed will be an ongoing regional concern. Leaching of mine tailings and overland flow of mercury-rich soils have resulted in the downstream accumulation of mercury in the Guadalupe River watershed, thereby contaminating the river and its tributaries, including Guadalupe Creek and Alamitos Creek. This issue constitutes an ongoing significant cumulative impact under NEPA and CEQA.

The following mitigation measures would avoid and minimize cumulative impacts from disturbance and transport of methyl mercury in the watershed, resulting in a less-than-significant cumulative impact.

Assess Mercury Transport and the Potential for Methylation in the Guadalupe River Watershed. SCVWD is committed to participating with the San Francisco Bay RWQCB and other appropriate agencies in assessing mercury transport in the Guadalupe River and the potential for methylation associated with any wetland and riparian mitigation on SCVWD's lands as part of the mercury TMDL program for San Francisco Bay and the Guadalupe River. SCVWD will coordinate with the San Francisco Bay RWQCB regarding monitoring methods for the proposed monitoring program. SCVWD's participation will include continuous monitoring of flow, as well as monitoring of total suspended solids and total and bioavailable mercury.

Methyl mercury concentrations in channel bed sediments of the Guadalupe River will also be monitored. SCVWD monitoring of methyl mercury concentrations will be conducted in freshwater, seasonal wetland, and riparian environments at sites approved by the San Francisco Bay RWQCB. Monitoring will be conducted for 5 years starting in 2001. Watershed monitoring will be coordinated with pre- and postproject monitoring as described in Section 5.3.3.3, "Toxic Constituents – Mercury" and other localized monitoring efforts in the watershed such as on Guadalupe Creek. The data collected from the monitoring will be used by SCVWD and the San Francisco Bay RWQCB to develop BMPs to minimize methylation and the overall transport of mercury-laden sediments to San Francisco Bay.

Although this monitoring would assist in the San Francisco Bay RWQCB's efforts to minimize and manage the adverse effects of mercury in Guadalupe River sediments, the most effective way to reduce the amount of mercury in the Guadalupe River is to control its discharge to the river from sources in the upper watershed. However, such actions are beyond SCVWD's authority and jurisdiction. Ultimately, regional implementation of the TMDL will be necessary to solve the regional mercury contamination problem.

Develop and Implement the TMDL or Similar Program for Mercury for San Francisco Bay. The San Francisco Bay RWQCB is developing a TMDL for mercury for the San Francisco Bay and has the responsibility and jurisdiction to implement it. The TMDL program proposes a significant reduction in the transport of mercury to the San Francisco Bay from the Guadalupe River system. The goal of the TMDL for mercury in the San Francisco Bay region is to reduce in-bay sediment concentrations to less than 0.4 mg/kg in fine sediments less than 63 micrometers. The TMDL will identify involved parties and their proportional responsibility for the reduction of mercury inputs to the San Francisco Bay. SCVWD will participate in the TMDL program.

6.2.4.4 Temperature

Cumulative impacts of projects in the Guadalupe River watershed on water temperature primarily result from the removal of riparian vegetation and shading along the river corridor. Consequently, river water temperatures would be affected primarily by construction of the three flood protection projects. As described in Section 5.3, "Water Quality," the JSATEMP model was used to evaluate the potential impacts on water temperature in the Guadalupe River. For this analysis of cumulative impacts, impacts on water temperature were evaluated for the construction and operation of the Upper Guadalupe River Project in combination with the Guadalupe River Project with Bypass System Alternative. The analysis included a postproject construction scenario and a postmitigation scenario. The postmitigation modeling scenario includes planting of riparian vegetation to provide shade at the Upper Guadalupe River Project site, the Guadalupe River Project site, and the Guadalupe Creek and Reach A mitigation sites. The Lower Guadalupe River Project area is not included in this cumulative temperature analysis because the final design of the Lower Guadalupe River Project has not been determined.

Water temperatures in the Guadalupe River are likely to increase immediately after construction of the Upper Guadalupe River Project. Increased water temperatures caused by the Upper Guadalupe River Project are expected to be greatest in year 12 of the 25-year construction period for that project, which is approximately 10 years after the scheduled completion of the Guadalupe River Project with Bypass System Alternative (Santa Clara

Valley Water District and U.S. Army Corps of Engineers, 1998). Because its construction would cause warmer water to flow into the downstream project area, the Upper Guadalupe River project would result in a cumulative impact on water temperatures because it would add to the water temperature increases caused by the Guadalupe River Project with Bypass System Alternative alone. Construction of the Upper Guadalupe River Project would contribute relatively small increases to postproject water temperatures in the downtown project area. During year 12, the greatest incremental addition to the average maximum temperature (0.8 °F) in the downtown Project area would occur at the most upstream point in Segment 3 (model segment 30) during August of a dry-/median-year precipitation type (Figures 6.2-4 and 6.2-5). The total increase in the average maximum temperature at model segment 30 would be 3.2 °F. The largest combined temperature increase in year 12 would be 6.5 °F in model segment 32 in the downtown San Jose area. Downstream from Coleman Avenue and through Reach A and the Lower Guadalupe River Project area, postproject water temperatures would be no different than for the Guadalupe River Project with Bypass System Alternative alone.

Under postmitigation conditions for the combined Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative, shade provided by plantings of riparian vegetation would reduce the water temperatures to below postproject levels. Shade would begin to cool water temperatures immediately after establishment of new vegetation. The shade and cooling effect would increase over time and maximum shade value is expected at maturity of the SRA cover vegetation, within about 40 years of Project implementation. SRA cover vegetation planted as part of the Upper Guadalupe River Project would shade the river upstream from I-280 and reduce water temperatures in the Upper Guadalupe River Project area to levels lower than preproject levels (Figures 6.2-4 and 6.2-5). Temperatures in Guadalupe Creek would also be lower than preproject levels. Postmitigation temperatures downstream from I-280 would be slightly lower than postmitigation temperatures resulting from the Guadalupe River Project with Bypass System Alternative alone. However, temperatures downstream from I-280 would still be slightly elevated compared to preproject conditions. Temperatures in Reach A would be lower than under preproject conditions; water flowing from Reach A into the upper end of the Lower Guadalupe River Project would therefore be cooler than under existing conditions.

The cumulative postproject impacts on water temperature of the Upper Guadalupe River Project combined with the Guadalupe River Project with Bypass System Alternative are considered less than significant because postmitigation water temperatures would be reduced to preproject levels in most of the Guadalupe River watershed.

The cumulative impacts of the three flood protection projects on water temperatures in the Lower Guadalupe River Project area downstream from Reach A cannot be determined at this time because the final design of the Lower Guadalupe River Project has not been determined and detailed water temperature modeling has not yet been conducted. Water temperature modeling data (Figures 6.2-4 and 6.2-5) for the combined Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative indicate that postproject water temperatures below Reach A would be the same as under preproject conditions. Postmitigation temperatures for the combined Upper Guadalupe River Project and Guadalupe River Project with Bypass System Alternative would result in water temperatures that are cooler than preproject conditions below Reach A in the Lower

Guadalupe River Project area. However, the Lower Guadalupe River Project may cause increased postproject water temperatures downstream from Reach A if SRA cover vegetation is removed or the stream channel is modified.

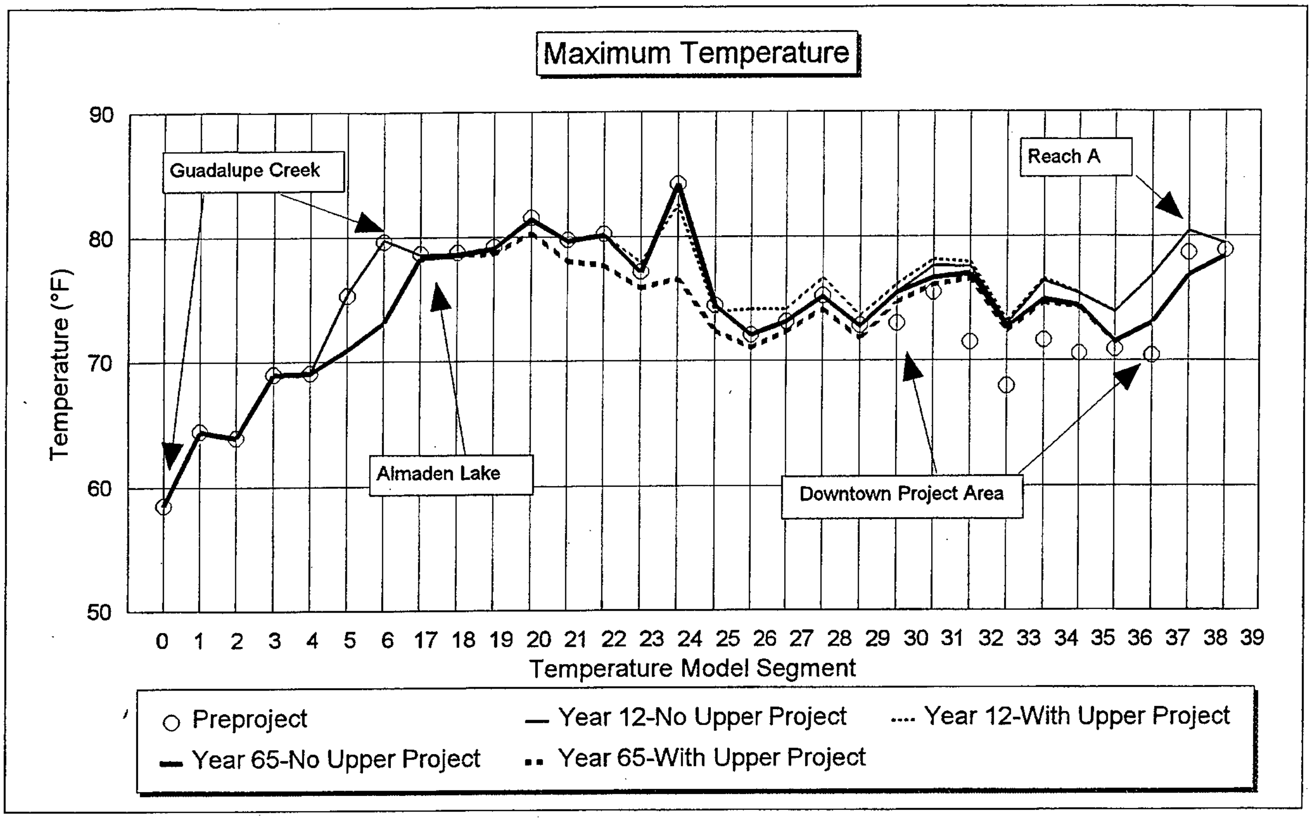
It is suspected that tidally caused mixing of Guadalupe River and San Francisco Bay water has a large influence on water temperatures in the tidally affected reach downstream from the Montague Expressway. The tidal mixing, upstream warming, and in-channel warming of the lower Guadalupe River from removal of SRA cover vegetation will be assessed in the environmental analysis for the Lower Guadalupe River Project in association with other past, present, and reasonably foreseeable future projects. The JSATEMP temperature model for the Guadalupe River is being modified to include simulation of the Lower Guadalupe River Project area. The modified JSATEMP model will be used to evaluate potential direct and cumulative temperature impacts on water temperature of all flood protection projects on the Guadalupe River. Temperature modeling will be used in part to define the quantity of mitigation plantings of riparian vegetation needed to mitigate water temperature impacts.

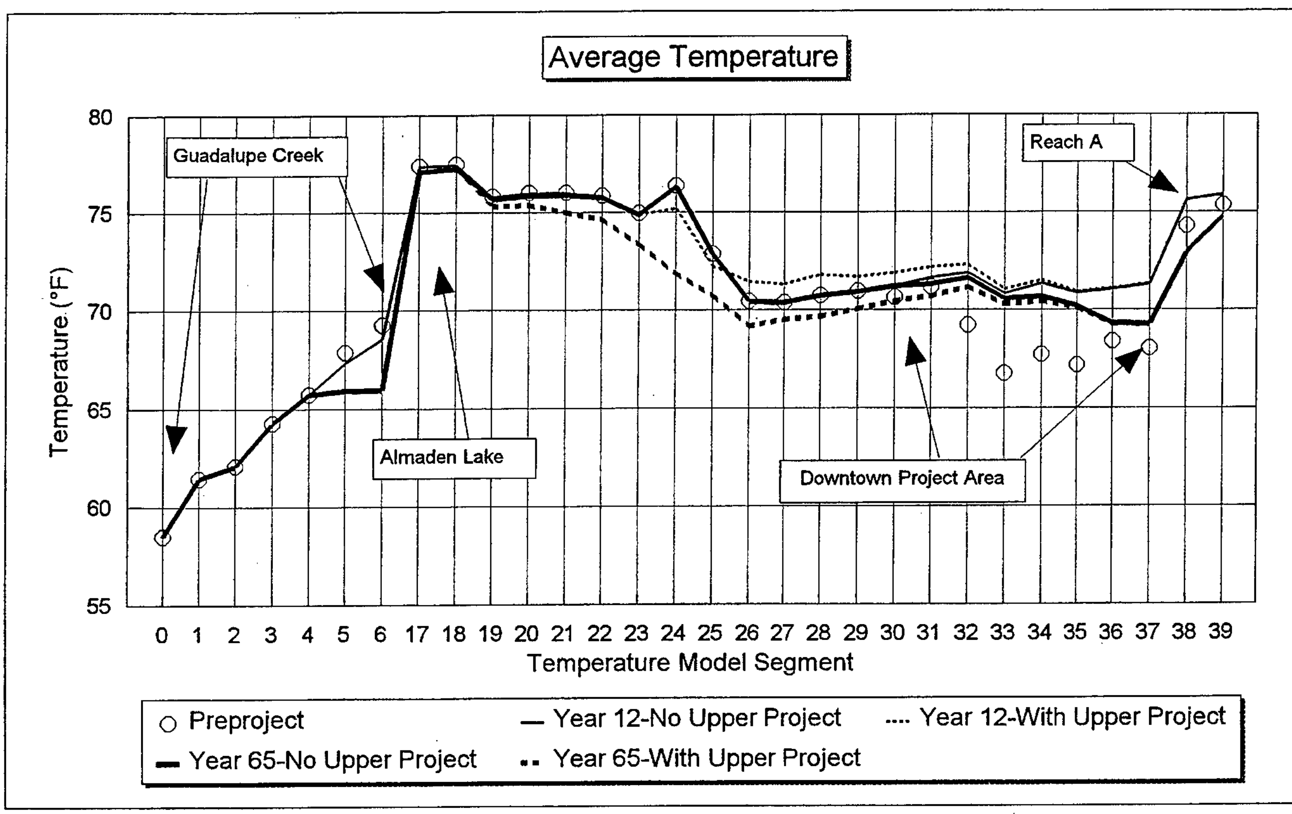
6.2.4.5 Dissolved Oxygen

As described in Section 6.2.4.4, "Cumulative Impacts on Water Quality – Temperature," the combined Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative would cause an increase in average maximum temperature of 0.8 °F in the downtown San Jose area. The largest combined temperature increase due to the combined Upper Guadalupe River Project and Guadalupe River Project with Bypass System Alternative would be 6.5 °F between Park Avenue and West Santa Clara Street (model segment 32) (Section 6.2.4.4, "Cumulative Impacts on Water Quality – Temperature"). This temperature increase would result in a cumulative maximum decrease in dissolved oxygen concentrations of approximately 0.6 mg/L, which is approximately 0.1 mg/L less than the Guadalupe River Project with Bypass System Alternative alone (Section 5.3.3, "Water Quality – Bypass System Alternative").

The cumulative impact of increased water temperatures on dissolved oxygen concentrations of approximately 0.6 mg/L is considered less than significant because the decrease in dissolved oxygen concentrations is within the natural range of daily variations in dissolved oxygen.

Cumulative impacts on temperatures and associated impacts on dissolved oxygen concentrations downstream from Reach A following construction of the Lower Guadalupe River Project are not known because the project is in the early stages of planning and temperature modeling for the Lower Guadalupe River Project has not yet been conducted. Full maturation of the SRA cover vegetation mitigation plantings in Reach A is expected to result in net reductions in water temperatures entering the lower Guadalupe River. Consequently, dissolved oxygen levels of water entering the lower Guadalupe River from Reach A should be equal to or lower than under existing conditions. Reduced water temperatures have a beneficial impact on dissolved oxygen: the levels of dissolved oxygen tend to increase with reductions in water temperature. In the tidally influenced reach downstream from the Montague Expressway, cumulative impacts on dissolved oxygen would be less than in free-flowing stream reaches because daily tidal exchange would produce substantial mixing of river and San Francisco Bay water. Increased mixing of water generally increases aeration of the water and dissolved oxygen levels.



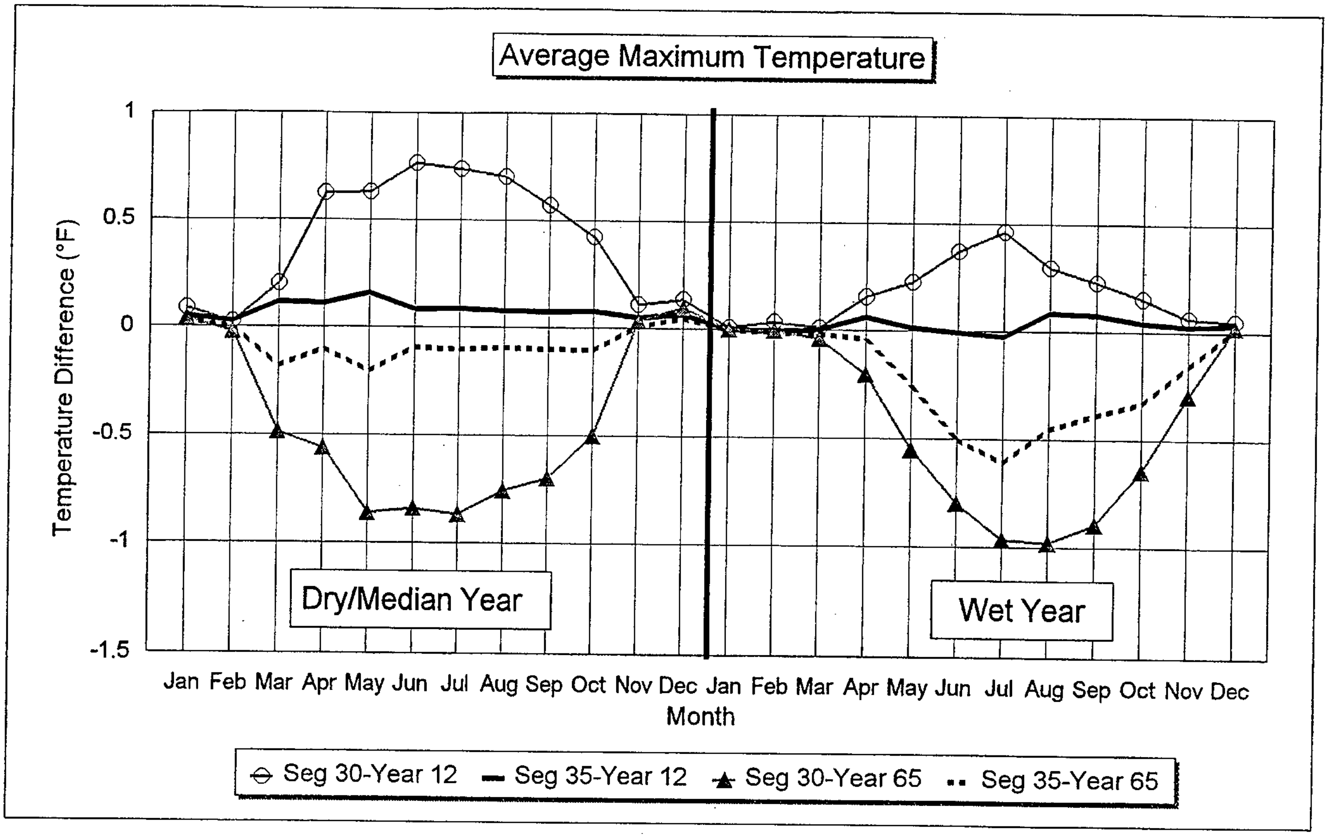


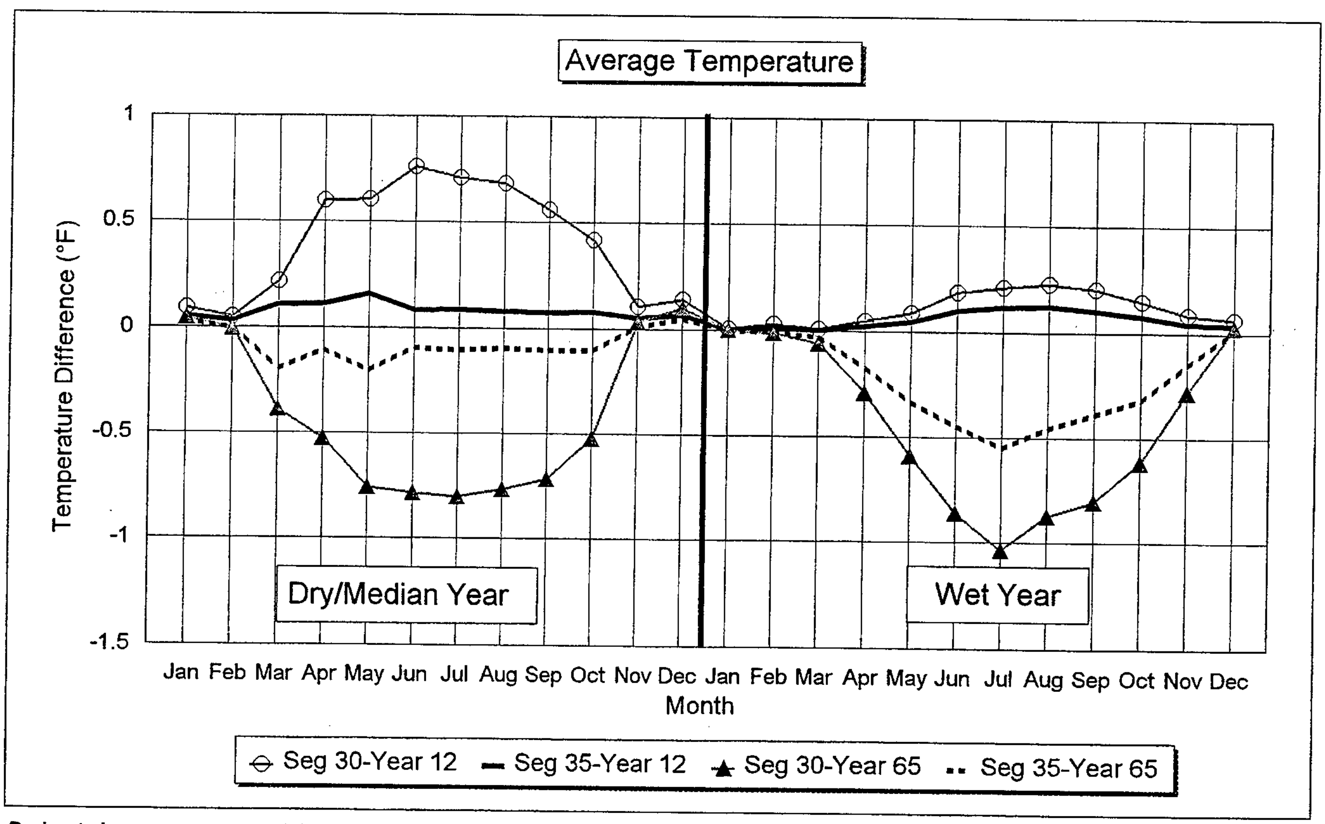
Preproject = 1990 conditions; Postproject = year 0 after construction; Postmitigation = year 40 after construction *Revised*

Note: "Upper Project" represents the Upper Guadalupe River Project

Figure 6.2-4 Simulated Temperatures for August of the Dry/Median Year for the Guadalupe River Project with Bypass System Alternative

The potential Guadalupe Creek mitigation site is represented by model segments 5-6; Segments 1, 2, and 3 of the Guadalupe River Project include model segments 30-37; and Reach A consists of model segments 38-39.





Designated years represent total time elapsed since construction of the Guadalupe River Project with Proposed Action *Revised*

Figure 6.2-5 Interrelated Effect of Upper Guadalupe River Project and Guadalupe River Project with Bypass System Alternative on Simulated Temperatures under Both Projects Minus Temperatures with only the Guadalupe River Project with Bypass System Alternative

The I-280 bridge is represented by model segment 30; Coleman Avenue is represented by segment 35.

6.2.5 Cumulative Impacts on Biological Resources – Vegetation

This cumulative impact analysis is based on a reconnaissance-level field inventory of riparian habitats, including SRA cover vegetation, throughout the Guadalupe River system (The Habitat Restoration Group, 1990) and on a review of documents describing proposed and approved projects. This section includes an overview of historical changes in terrestrial habitat in the Guadalupe River system and an analysis of potential cumulative impacts on riparian vegetation, SRA cover vegetation, wetlands, and salt marsh habitat. Cumulative impacts on upland habitat are not expected to be significant because little upland habitat would be affected by projects in or directly adjacent to the Guadalupe River.

6.2.5.1 Riparian Vegetation

No previous studies have analyzed the cumulative impacts of projects in the Guadalupe River watershed on the historical extent and distribution of riparian habitat in the watershed. Substantial portions of the system have been highly disturbed since the 1930s. Table 6.2-2 lists major water management and related projects that have been previously constructed, and they may have reduced the extent of riparian habitat along the Guadalupe River and its tributaries. In addition, many small commercial, industrial, residential, and agricultural development projects not listed in Table 6.2-2 have been constructed in the Guadalupe River watershed.

Historical human impacts in the Santa Clara Valley from agriculture, urban expansion, and water development have resulted in a substantial loss of riparian habitat in the Guadalupe River system. Fragmentation and disturbance of riparian habitat as well as a reduction in flooding and introduction of nonnative species have degraded much of the remaining habitat. Riparian habitat is currently found along 60.9 bank miles of the Guadalupe River watershed, representing 51.0 percent of the watershed total of 119.4 bank miles (Table 6.1-1). The Guadalupe River has approximately 16.5 bank miles of riparian habitat, representing 44.0 percent of the Guadalupe River's total of 37.6 bank miles, from the Alviso UPRR Bridge to the Guadalupe River's confluence with Alamitos Creek (Table 6.1-1). However, up to 6.0 bank miles of the Guadalupe River upstream from the Alviso UPRR Bridge is tidally influenced and supports little or no riparian vegetation. Therefore, the 16.5 bank miles of riparian habitat represents approximately 52 percent of the 31.6 bank miles of the Guadalupe River capable of supporting riparian vegetation. Approximately 4.0 bank miles have been modified, primarily in the last 60 years, through the installation of gabions, concrete lining, and riprap and widening and dredging. The remaining 11.1 bank miles of the Guadalupe River are now bare or have been converted to ruderal vegetation or upland landscaping. The impacts of these past activities are reflected in the description of the affected environment provided in Section 4.4, "Biological Resources – Vegetation." Existing areas of major vegetation types in the Guadalupe River watershed are summarized in Table 6.2-3.

Table 6.2-4 summarizes the approximate incremental and cumulative acreages of riparian habitat loss resulting from projects under construction or recently approved in the Guadalupe River watershed. Most of the impacts would be on cottonwood/willow forest, which has high botanical and wildlife values. The Upper and Lower Guadalupe River Projects and the Guadalupe River Project with Bypass System Alternative would contribute to impacts on approximately 27 acres of riparian habitat (approximately 80 percent of the total in Table 6.2.4). A total of 100 percent of the riparian mitigation for the Guadalupe River

TABLE 6.2-2. Historical Projects That Have Affected the Extent and Distribution of Riparian Habitat in the Guadalupe River Watershed

Affected Reach	Project Description	Construction Date
Guadalupe River		
Willow Glen Way to Willow Street	Lewis Canal	1866
Alviso Slough County Marina and Union Pacific Railroad to Highway 101	SCVWD channelization/levee improvements	1963 to 1965, 1985
Highway 101 to I-880	SCVWD channel excavation, levees adjacent to San Jose Airport	Late 1960s
Branham Lane to Blossom Hill Road	Gravel quarry operation	Before 1970s
Coleman Avenue to Blossom Hill Road	SCVWD percolation ponds: Los Capitancillos and Almaden	1970
Blossom Hill Road to Almaden Expressway and Coleman Avenue	SCVWD flood protection project, gabion slope protection, drop structure replacement, in-channel percolation ponds	1970, 1976
Ironwood Drive to Foxworthy Avenue, Almaden Expressway to 6,600 feet upstream	Santa Clara County Transportation Agency widening of Almaden Expressway, gabion slope protection, rock lining	1972 to 1973
From 4,150 to 8,240 feet upstream from Highway 237	Westerly bank levee	1974
Los Gatos Creek		
Downstream from Vasona Reservoir	Construction of Vasona Reservoir	1935
Downstream from Vasona Reservoir	Series of three drop structures	1972
Downstream from Lexington Reservoir	Construction of Lexington Reservoir	1952
Lexington Reservoir to Saratoga Avenue	Concrete channelization and levee slopes associated with construction of Highway 17	1966 to 1969
Ross Creek		
Confluence with Guadalupe River to Kirk Road	Channelization	1955
Camino del Cerro to Kirk Road	Channelization	1955
Canoas Creek		
Almaden Road to Canoas Creek	Channelization	1970
Nightingale Drive to Cottle Road	Channelization	1967
Almaden Expressway to Nightingale Drive	Channelization	1976
Guadalupe Creek		
Downstream from Guadalupe Reservoir	Construction of Guadalupe Reservoir	1935
Downstream from Guadalupe Reservoir	Construction of Masson Dam	Pre-1940
Confluence with Guadalupe River to Camden Avenue	SCVWD flood protection modified floodplain	1982
Alamitos Creek		
Downstream from Almaden Reservoir	Construction of Almaden Reservoir	1935
Camden Avenue to McKean Road	Grading, berms (private developer)	1975
Camden Avenue to Almaden Lake Park	SCVWD channelization	1980
Arroyo Calero		
Downstream from Calero Reservoir	Construction of Calero Reservoir	1935

Source: Santa Clara Valley Water District.

TABLE 6.2-3. Existing Vegetation Types Along the Guadalupe River Watershed

	Main Stem		Tributaries		System	
Habitat	**Acres**	**Percent of Total**	**Acres**	**Percent of Total**	**Acres**	**Percent of Total**
Riparian						
Sycamore	0	0	240.1	61	240.1	41
Cottonwood/Willow	95.8	49	9.9	3	105.7	18
Foothill	0	0	52.3	13	52.3	9
Mixed	0	0	5.8	1	5.8	1
Willow	0	0	3.0	1	3.0	1
Revegetation	1.1	1		0	1.1	<1
Subtotal	**96.9**	**50**	**311.1**	**80**	**408.0**	**70**
Nonriparian						
Upland Landscaping	5.5	3	6.2	2	11.7	2
Ruderal (Scrub and Herbaceous)	91.6	47	73.2	19	164.8	28
Bare	1.6	1	0.3	<1	1.9	<1
Subtotal	**98.7**	**50**	**79.7**	**20**	**178.4**	**30**
Total	**195.6**	**100**	**390.8**	**100**	**586.4**	**100**

Source: The Habitat Restoration Group, 1991 (unpublished data).

Project with Bypass System Alternative has already been planted, 1 to 3 years prior to the implementation of project components that would result in approximately 50 percent of the impacts. The Upper Guadalupe River Project includes establishment of 65 percent of the proposed riparian forest mitigation prior to 4 percent of the impacts. The proposed SCVWD Stream Maintenance Program could affect from 75 to 600 acres of riparian habitat in the Santa Clara and Pajaro River Basins due to proposed revegetation, enhancement, and land management. Impacts would be fully mitigated. The other projects addressed in this cumulative impact analysis will also fully mitigate for impacts on riparian habitat. The projects included in Table 6.2-4 include mitigation site protection plans and vegetation protection plans, which avoid or minimize impacts during construction and after mitigation plantings.

Because of the early mitigation for riparian losses, no significant indirect or cumulative impacts on riparian vegetation are expected. No additional mitigation for the incremental impact of the Guadalupe River Project with Bypass System Alternative is required.

6.2.5.2 SRA Cover Vegetation

Implementing the Upper Guadalupe River Project would provide 4,886 lf of SRA cover vegetation mitigation and 1,720 lf of undercut bank mitigation. The Upper Guadalupe River Project also includes an additional 8,462 lf of SRA cover vegetation. The Guadalupe River Project with Bypass System Alternative would affect 8,821 lf of SRA cover vegetation and would provide approximately 18,026 lf of SRA cover vegetation mitigation. The Santa Clara

TABLE 6.2-4. Projects with Direct Cumulative Impacts on the Riparian Habitat in the Guadalupe River Watershed and Mitigation Required (acres)

	Impact	Mitigation
Guadalupe River Project with Bypass System Alternative	14.12	21.0
Guadalupe River Park Project	0.0[a]	0.0[a]
State Route 87 Freeway Upgrade from Highway 101 to Julian Street	5.74	10.95
State Route 85 Transportation Corridor Project	0.1[b]	12.1
Santa Clara Valley Water District Fish Ladder Construction Program	0.1	0.2
Guadalupe Creek Restoration Project	0.51	1.00
Upper Guadalupe River Flood Control Project	10.45	20.89[c]
Lower Guadalupe River Flood Protection Project	2.5[d]	2.5[e]
SCVWD Stream Maintenance Program (proposed)	75.0[f]	75.0[f]
Los Gatos Creek Trail Project Phase IIA.A	0.25	0.62
Vasona Light Rail Extension Project	0.23	0.23
Total	**110.00**	**144.49**

[a] Riparian impacts and mitigation are included in the Guadalupe River Project with Bypass System Alternative.
[b] The project will directly affect 0.1 acre of riparian vegetation along the Guadalupe River main stem and indirectly affect 4.5 acres on Los Gatos and Ross Creeks. Mitigation for loss of riparian habitat requires planting 12.1 acres of riparian vegetation onsite and 0.2 acre offsite (Monette, 1992).
[c] An additional 5.53 acres will be established by SCVWD for use as mitigation for other projects.
[d] Assumes the sediment removal alternative is selected.
[e] Estimate.
[f] Estimate: includes proposed revegetation, enhancement, and land management (Santa Clara Valley Water District, 2000). Amount could range from 75 to 600 acres.

Valley Water District Fish Ladder Construction Program affected 82 lf of SRA cover vegetation, which was mitigated directly upstream from the project site. The Guadalupe Creek Restoration Project would affect an estimated 240 lf of SRA cover vegetation. The potential impacts of the Lower Guadalupe River Project on SRA cover vegetation cannot be determined at this time. However, it is possible that some cumulative impacts may result. Any impacts that the Lower Guadalupe River Project may have on SRA cover vegetation will be analyzed in the environmental documents for that project. The cumulative impacts of the Lower Guadalupe River Project in association with other past, present, and reasonably foreseeable future projects will also be addressed.

Direct loss of SRA cover vegetation resulting from implementation of the projects discussed above will be fully mitigated. For the Upper Guadalupe River Project, 92 percent of the proposed SRA cover vegetation mitigation will be established before 9 percent of the project's impacts on SRA cover vegetation occur. For the Guadalupe River Project with Bypass System Alternative, approximately 100 percent of the proposed SRA cover vegetation mitigation will be established before 51 percent of the project's impacts on SRA cover vegetation occurs. The two projects combined will result in a more than doubling of the SRA cover vegetation along the Guadalupe River compared with existing conditions. The cumulative impact of removing streamside vegetation is therefore considered less than significant, and no additional mitigation is required.

6.2.5.3 Wetlands

The Guadalupe River Project with Bypass System Alternative would not affect jurisdictional wetlands (Section 5.4.3.3, "Wetlands"). The Guadalupe Creek Restoration Project, the Upper Guadalupe River Project, and the Vasona Light Rail Extension Project would result in impacts on 0.94, 1.47, and 0.41 acres of jurisdictional wetlands, respectively. The wetlands that would be affected by these projects are all riverine wetlands. The proposed SCVWD Stream Maintenance Program could affect approximately 100 acres of nontidal wetlands and 30 acres of tidal wetlands in Santa Clara and Pajaro River Basins. The Alviso Ring Levee affected 3.14 acres of seasonal wetlands. The projects will mitigate impacts on at least a 1:1 basis. The other projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses," will not affect wetlands. The Alviso Ring Levee Wetland Mitigation and Restoration Project includes the creation of 6.93 acres of seasonal wetlands and restoration of 3.14 acres of seasonal wetlands. Impacts on other waters will be temporary. The impacts of these projects will not result in significant cumulative impacts because the impacts have been or will be fully mitigated. The potential impacts of the Lower Guadalupe River Project on wetlands can only be estimated at this time. If the sediment removal alternative is selected, up to 65 acres of wetlands and an estimated 30 acres of other waters of the United States could be affected. Any impacts of the Lower Guadalupe River Project on wetlands will be analyzed in the environmental documents for that project. The cumulative impacts of the Lower Guadalupe River Project in association with other past, present, and reasonably foreseeable future projects will also be addressed. If cumulative impacts on wetlands are identified, the Lower Guadalupe River Project environmental documents will determine the appropriate mitigation.

6.2.5.4 Alviso Slough Salt Marsh and Wetlands

Cumulative impacts on salt marshes and wetlands in Alviso Slough would be due primarily to the effects of the projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses." These projects could affect hydrologic and hydraulic conditions in Alviso Slough, as discussed in Section 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions." With the possible exception of the Lower Guadalupe River Project, these projects would have no direct construction-related effects on the salt marshes and wetlands in Alviso Slough.

The Lower Guadalupe River Project includes Alviso Slough between the Alviso UPRR Bridge and the confluence of Alviso Slough with Coyote Creek (Figure 6.1-1). In September 1999, marsh habitats and associated dominant plant species were mapped along Alviso Slough, using color infrared digital orthographic images as a base (H. T. Harvey & Associates, 1999b). The following description of biotic habitats along the length of Alviso Slough is based on this survey. It is included to assist in the evaluation of the cumulative impacts of the projects in the Guadalupe River watershed on salt marsh habitat and species in the Alviso Slough area.

Salt Marsh and Wetlands. Tidal marsh occurs along the length of Alviso Slough between the levees of the salt evaporation ponds and the slough channel. This elongate tidal marsh complex extends from the Gold Street Bridge in Alviso to the confluence of Alviso Slough and Coyote Creek, immediately adjacent to San Francisco Bay. At the time of mapping, the tidal marsh complex included three habitat types: freshwater marsh, brackish marsh, and salt marsh. The approximate boundaries of freshwater marsh, brackish marsh, and salt

marsh are shown in Figure 6.2-6. The Alviso Slough benches, which contain much of the marsh habitat, are under the jurisdiction of the California State Lands Commission. The levees and salt ponds are owned and maintained by the Cargill Salt Company, with the exception of pond A6, which is owned by USFWS.

Freshwater marsh habitat occurs from the Gold Street Bridge downstream for approximately 3,300 lf. The dominant plant species of this habitat type in Alviso Slough are California bulrush (*Scirpus californicus*), tule (*Scirpus acutus*), alkali bulrush (*Scirpus maritimus*), and cattail (*Typha* sp.).

Cumulative Impacts. As discussed in Section 6.2.1.8, "Lower Guadalupe River Flood Protection Project," the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative will not be made operational until the Lower Guadalupe River Project has been completed.

Between the Highway 101 bridge and the Highway 237 bridge, the channel capacity is limited to approximately 14,000 cfs, as discussed in Section 6.2.2.1, "Channel Capacity of the Guadalupe River Downstream from I-280." The channel capacity between the Highway 101 bridge and the Highway 237 bridge serves to limit the peak floodflows that can be conveyed in the lower Guadalupe River. Under existing conditions, flows greater than 14,000 cfs break out of the channel along the lower Guadalupe River upstream from the Highway 237 bridge. Downstream from the Highway 237 bridge, floodflows in the Guadalupe River are limited to 14,000 cfs. Floodflows overtop the west levee into adjacent salt evaporation ponds just downstream from the Alviso UPRR Bridge. When flows reach 14,000 cfs at the Alviso UPRR Bridge, approximately 5,500 cfs flows into the salt evaporation ponds because of low spots on the west levee, and floodflows are approximately 8,500 cfs in Alviso Slough.

Because of the channel capacity of only 14,000 cfs at the Highway 237 bridge, the slough benches just downstream from the Alviso UPRR Bridge are inundated by up to 6.5 feet (2 meters) of water, and the slough benches in the middle of Alviso Slough are inundated by approximately 3 feet (1.0 meter) of water (Figure 6.2-7).

The channel capacities in the lower Guadalupe River/Alviso Slough area will remain the same as under existing conditions until the Lower Guadalupe River Project has been completed. The lower Guadalupe River/Alviso Slough area will not experience a change in floodflow frequency, duration, or magnitude from existing conditions as a result of the cumulative effect of the flood protection projects in the Guadalupe River watershed unless the Lower Guadalupe River Project changes the channel capacity at the Highway 237 bridge (Sections 6.2.1.8," Lower Guadalupe River Flood Protection Project," and 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions").

The combined Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project will not result in changes to the depth, frequency, or duration of inundation of slough benches. No significant cumulative impacts on marsh habitat in Alviso Slough would occur as a result of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project prior to construction of the Lower Guadalupe River Project.

Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of slough benches may or may not change. The potential direct and indirect impacts of the Lower Guadalupe River Project on

salt marsh habitat in Alviso Slough cannot be identified until the final design of the Lower Guadalupe River Project has been determined. It is possible that the Lower Guadalupe River Project could increase or decrease the floodflows entering Alviso Slough. It would therefore be speculative to attempt to define any potential impacts on salt marsh habitat before the final design of the Lower Guadalupe River Project has been determined. Potential impacts will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

See Section 6.2.6, "Cumulative Impacts on Biological Resources – Wildlife," for a discussion of the potential cumulative impacts on salt marsh wildlife species.

6.2.5.5 Salt Evaporation Ponds

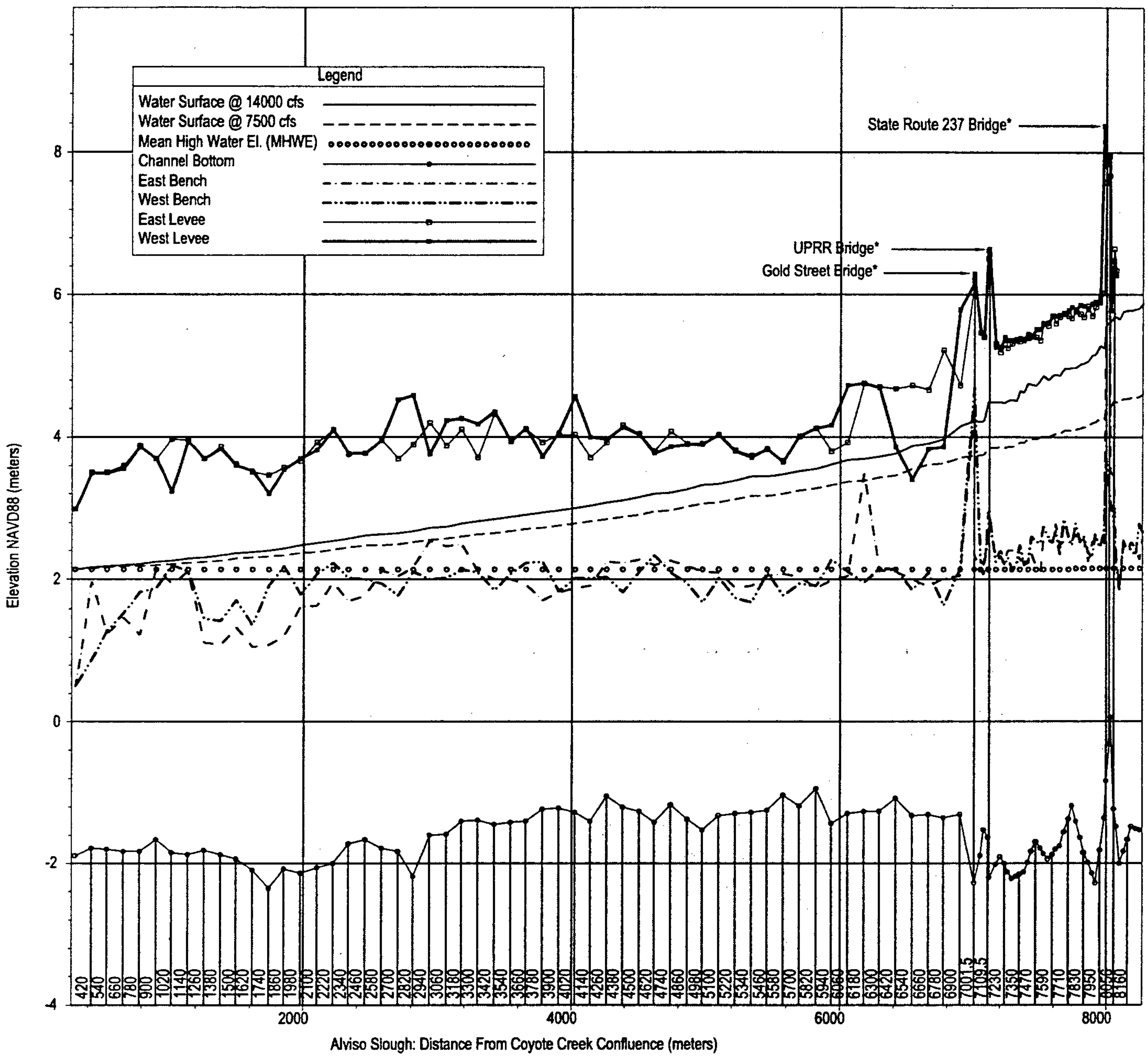
Cumulative impacts on salt evaporation ponds adjacent to Alviso Slough would be due primarily to the effects of the projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses." These projects could affect hydrologic and hydraulic conditions in Alviso Slough, as discussed in Section 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions." With the possible exception of the Lower Guadalupe River Project, these projects would have no direct construction-related effects on salt evaporation ponds adjacent to Alviso Slough.

Existing Salt Evaporation Pond Flooding. Under existing conditions, flows in Alviso Slough greater than approximately 6,800 cfs begin to overtop the west bank levee adjacent to Alviso (Station 6540 in Figure 6.2-7). The overtopping causes water to flow into salt evaporation pond A8W (Figure 6.2-6). The salt evaporation ponds provide habitat for the western snowy plover, a species federally listed as threatened. Under existing conditions, water flows into pond A8D from pond A8W when the depth of water in pond A8W reaches approximately 1.5 feet.

In addition, pond A8D can be flooded from high waters in Guadalupe Slough, which is located adjacent to the south and west levees of pond A8D. Guadalupe Slough is not part of the Guadalupe River watershed, and construction or operation of the Guadalupe Project with Bypass System Alternative will not affect the hydrology of Guadalupe Slough. The existing channel capacity of Guadalupe Slough ranges from 6,000 to 8,000 cfs, depending on where the levee is overtopped and on the tide elevation. Flows exceeded the capacity of Guadalupe Slough in 1998, contributing to and possibly causing most of the flooding of evaporation pond A8D.

A flow of 14,000 cfs represents the existing channel capacity of the lower Guadalupe River at the Highway 237 bridge. With a flow of 14,000 cfs at the Highway 237 bridge, pond A8W would be inundated to a depth of 6.0 feet and pond A8D would be inundated to a depth of 3.5 feet. Ponds A5 through A7 (Figure 6.2-6) would also be inundated. During past flood events, such as those in 1996 and 1998, water remained in portions of pond A8D as late as June.

Cumulative Impacts. As discussed in Section 6.2.1.8, "Lower Guadalupe River Flood Protection Project," the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative will not be made operational until the Lower Guadalupe River Project has been completed.



*Downstream edge of each crossing.

Figure 6.2-7. Profile of Alviso Slough: Mean High Water Elevation and Elevation of Floodflows of 7,500 cfs and 14,000 cfs

Between the Highway 101 bridge and the Highway 237 bridge, the channel capacity is limited to approximately 14,000 cfs, as discussed in Section 6.2.2.1, "Channel Capacity of the Guadalupe River Downstream from I-280." The channel capacity between the Highway 101 bridge and the Highway 237 bridge serves to limit the peak floodflows that can be conveyed in the lower Guadalupe River. Under existing conditions, flows greater than 14,000 cfs break out of the channel along the lower Guadalupe River upstream from the Highway 237 bridge. Downstream from the Highway 237 bridge, floodflows in the Guadalupe River are limited to 14,000 cfs. Floodflows overtop the west levee into adjacent salt evaporation ponds just downstream from the Alviso UPRR Bridge. When flows reach 14,000 cfs at the Alviso UPRR Bridge, approximately 5,500 cfs flows into the salt evaporation ponds because of low spots on the west levee, and floodflows are approximately 8,500 cfs in Alviso Slough.

The channel capacities in the lower Guadalupe River/Alviso Slough area will remain the same as under existing conditions until the Lower Guadalupe River Project has been completed. The lower Guadalupe River/Alviso Slough area will not experience a change in floodflow frequency, duration, or magnitude as a result of the cumulative effect of the flood protection projects in the Guadalupe River watershed unless the Lower Guadalupe River Project changes the channel capacity at the Highway 237 bridge (Section 6.2.1.8, "Lower Guadalupe River Flood Protection Project," and Section 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions").

The combined Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project will not result in changes to the depth, frequency, or duration of flooding of salt evaporation ponds. No significant cumulative impacts on salt evaporation ponds would occur as a result of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project prior to construction of the Lower Guadalupe River Project.

Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of salt evaporation ponds may or may not change. The potential direct and indirect impacts of the Lower Guadalupe River Project on salt evaporation ponds cannot be identified until the final design of the Lower Guadalupe River Project has been determined. It is possible that the Lower Guadalupe River Project could increase or decrease the floodflows entering Alviso Slough. It would therefore be speculative to define any potential impacts on the salt evaporation ponds before the final design of the Lower Guadalupe River Project has been determined. Potential impacts will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

See Section 6.2.6, "Cumulative Impacts on Biological Resources – Wildlife," for a discussion of the potential cumulative impacts of changes in the inundation of salt evaporation ponds on the snowy plover.

6.2.6 Cumulative Impacts on Biological Resources – Wildlife

6.2.6.1 Overview of Disturbance Resulting from Human Activities

Implementation of projects in the Guadalupe River watershed would result in substantial long-term increases in human activity along the Guadalupe River riparian corridor. In addition, SCVWD has a policy governing joint public use of SCVWD facilities (Santa Clara Valley Water District, Resolution No. 74-38) that would allow future park projects to use

floodway-maintenance roads as trails. After construction of the projects has been completed, increased human activities would include recreational uses, revegetation monitoring, and floodway-maintenance work (Appendix 7, "Recreation Plan"). These activities could cause increased disturbance of wildlife compared to current levels, especially during the spring breeding season for birds.

This cumulative impact would be greater than the sum of the impacts of each project separately because the impacts would occur close together both in time and space. Wildlife would therefore have more difficulty avoiding or tolerating disturbances. The contribution to wildlife disturbance of the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Park Project would be minimized by implementing the environmental commitments of the Proposed Project: the vegetation protection plan, planting riparian and SRA cover vegetation, and protecting the compensatory mitigation sites (Section 3.4.3, "Environmental Commitments"). The Upper Guadalupe River Project and the Guadalupe Creek Restoration Project would also include similar measures to minimize the impacts of recreational use on mitigation sites. The other projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analysis," with the possible exception of the Boston Property Project, discussed below, would not result in long-term increases in human activity in the Guadalupe River riparian corridor. The Lower Guadalupe River Project has not yet developed specific plans for accommodating recreational use, but it is expected that measures similar to those described above will be incorporated into the project design. The cumulative impact of disturbance to wildlife resulting from human activities, due to the projects discussed above, is considered less than significant because wildlife in the affected areas are already subjected to substantial disturbance from recreational use and urban activities adjacent to the project areas and because urban and recreational disturbances would increase even in the absence of the major projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analysis." In addition, the recreational trails will help to concentrate recreational use in specific corridors that are outside wildlife habitat areas. Therefore, no mitigation is required.

The Boston Property Project proposes three buildings that would be set back from the edge of the existing riparian corridor and riverwalk trail along the Guadalupe River by as much as 70 feet in some areas and 5 to 25 feet in other areas. The café elements would be 0 to 15 feet from the riparian corridor. The project would likely result in increased human disturbance of the riparian corridor. The buildings, depending on their design and lighting, could result in an increase in bird injury or death caused by collisions with windows. The proposed project could result in decreased value of the adjacent riparian corridor to wildlife, particularly birds (Stephens, pers. comm.).

An addendum to the Downtown Strategic Plan Programmatic EIR that addresses the proposed Boston Property Project is expected to be completed in late 2000. The addendum to the Downtown Strategic Plan Programmatic EIR must address the potential for impacts on wildlife using the riparian corridor and the SRA cover vegetation proposed as mitigation for the Guadalupe River Project with Bypass System Alternative and either avoid or fully mitigate those impacts. The project proponents of the Boston Property Project must coordinate with the Corps and SCVWD regarding their proposed design and the potential effect on the SRA cover vegetation proposed as mitigation for the Guadalupe River Project with Bypass System Alternative.

6.2.6.2 California Red-Legged Frog

The California red-legged frog is federally listed as threatened and is a State species of special concern. As indicated in Section 5.5, "Biological Resources – Wildlife," red-legged frogs have not been observed in the Guadalupe River system below Almaden Lake and the Guadalupe River does not provide suitable habitat for the red-legged frog. The Guadalupe River Project with Bypass System Alternative and the projects described in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses," would not affect the red-legged frog or habitat critical to its continued existence because the red-legged frog does not occur in areas affected by the projects. No indirect or cumulative impacts are expected as a result of the incremental impacts of the Bypass System Alternative.

6.2.6.3 Western Snowy Plover

The western snowy plover is federally listed as threatened and is a State species of special concern. Snowy plover populations have declined as a result of loss of nesting habitat, human disturbance at nesting sites, and predation. The snowy plover is a small shorebird about 6.25 inches in length. The coastal population of the western snowy plover occurs along the California coast and in its bays, and the species is a year-round resident in the San Francisco Bay area. Its breeding season is from mid-March through July, with peaks observed from early May through late June.

Habitat Requirements. The snowy plover has historically nested primarily on sandy coastal beaches and on the margins of alkali lakes and playas in inland areas. It is not known whether this species nested in San Francisco Bay before the conversion of salt marsh to salt evaporation ponds. However, these ponds have provided suitable nesting and foraging habitat since the beginning of the 20th century (Grinnell et al., 1918), and currently about 10 percent of the California population of snowy plovers breeds in San Francisco Bay salt ponds, mostly in the southern part of the bay (Page and Stenzel, 1981, Page et al., 1991). Critical habitat was proposed for the snowy plover on December 7, 1999; 19 areas along the coast were proposed as critical-habitat areas. No critical habitat was proposed for Santa Clara County, where the project will be constructed.

Occurrence in the Guadalupe River Watershed. Snowy plovers were recorded nesting on salt pond levees in Alviso as early as 1947 (Audubon Society, 1947). By this time, the snowy plover was probably well established as a breeder in the Alviso area. Breeding was confirmed there nearly every year during the 1950s (Audubon Field Notes 5:273, 10:359, 11:374, 13:451, Sibley, 1952), with a maximum of 14 nests found in 1955 (Smith, 1955). In 1971, Gill (1972) found nesting snowy plovers on the Knapp Gun Club property at the northern end of ponds A5 and A6 near the mouth of Alviso Slough (Figure 6.2-8). Page and Stenzel (1979) recorded snowy plovers in each of the three salt evaporation ponds bordering the south side of Alviso Slough (ponds A6, A7, and A8; Figure 6.2-8). They found a nest in pond A6, a brood on a levee bordering A7, and a single individual in A8.

Most recent information on snowy plover distribution along Alviso Slough has been compiled from incidental observations made by the San Francisco Bay Bird Observatory (SFBBO) during surveys of colonial waterbirds that were using the salt evaporation ponds along the slough (Ryan and Parkin, 1998). These survey data were collected only from levees; without standardized survey protocols; and, in some cases, without using a spotting scope. Using the data therefore represent a minimum estimate of the actual number of snowy plovers using the ponds. Snowy plovers have recently been recorded and confirmed

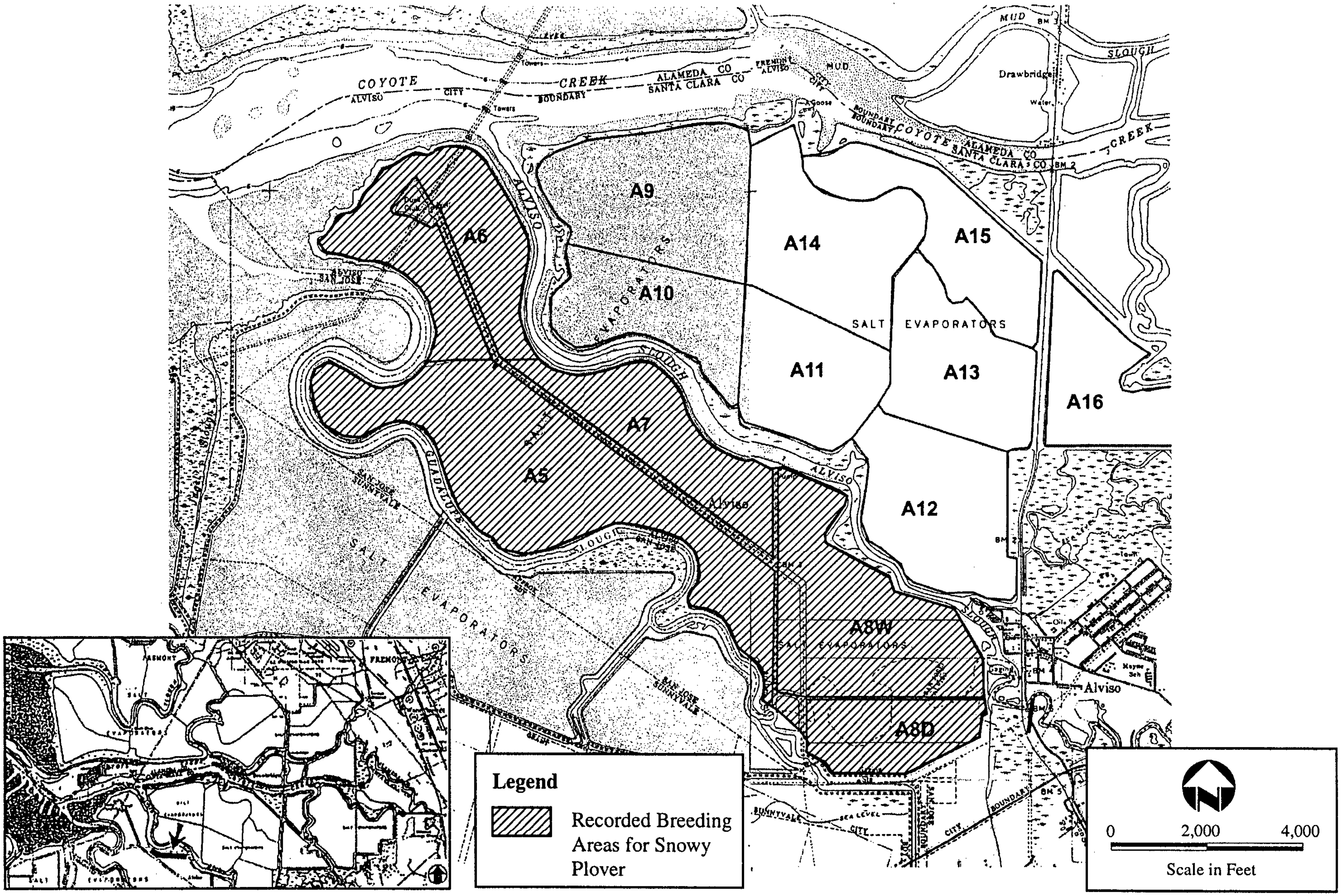


Figure 6.2-8. Recorded Breeding Areas for Western Snowy Plover - Lower Guadalupe River/Alviso Slough Area

to be nesting in two of the three salt evaporation ponds bordering the southern side of Alviso Slough (A6 and A8). In pond A6, at the lower end of Alviso Slough, the SFBBO detected snowy plovers during every year in which surveys were conducted between 1986 and 1994. As many as 18 individuals were observed in a single year; the average observation rate was 4 individuals per survey. Breeding was confirmed in lower Alviso Slough in 5 of the 9 survey years, with a peak count of two nests on May 14, 1994. Although the SFBBO has not recorded snowy plovers in pond A7, numerous sightings and confirmed nestings have been documented in pond A8, located south and west of the uppermost reaches of Alviso Slough. Here, between 1981 and 1997, snowy plovers were recorded in 11 of the 13 years in which the SFBBO conducted surveys. The maximum number observed was 20 adults in a single survey, and the average was 9.4 adult observations. Breeding was confirmed during 9 different years, with a maximum of 19 active nests on July 3, 1996. The vast majority of snowy plover activity in pond A8 was at the southern end of the pond, which is mostly dry during the breeding season in most years.

Incidental observations on pond A8 made by bird watchers – most of whom were viewing from the observation platform south of San Tomas Aquino Creek – and other incidental observations complement the SFBBO's data. On June 4, 1989, a year in which the SFBBO did not conduct breeding-season surveys at these ponds, a brood of snowy plover chicks was seen at the west end of pond A8 (Mammoser, pers. comm.). On June 4, 1993, a year in which the SFBBO conducted no surveys of the salt evaporation ponds, at least nine snowy plovers were seen in the south-central portion of pond A8 (Rottenborn, pers. comm.). Although breeding was not confirmed by the SFBBO or others in 1997, bird watchers observed one or two adult snowy plovers in pond A8 on four dates between April 8 and August 13 of that year. On May 13, 1998, an H. T. Harvey & Associates ornithologist observed 19 adults and 3 active nests at the south end of pond A8; in 1998, standing water was present in pond A8D until June. In 1999, protocol-level snowy plover surveys conducted by H. T. Harvey & Associates detected as many as 10 adults and 1 nest (H. T. Harvey & Associates, 1999a) (Figure 6.2-9). SCVWD recorded snowy plovers on 7 of 16 surveys conducted from March to July 1999, with a high of 18 observed on March 12, 1999 (Padley, pers. comm.). Snowy plovers have occasionally been recorded foraging in the diked ponds on the northeast side of Alviso Slough (ponds A9–A12) by bird watchers. However, ponds A10, A11, and A12 usually contain water all year, and water in pond A9 generally does not begin to recede until late summer. As a result, snowy plovers probably do not nest in or around these ponds or they do so only sporadically and in small numbers. Past surveys of snowy plovers in the southern San Francisco Bay area (Gill, 1972, Page and Stenzel, 1979) failed to find nesting snowy plovers in these ponds. The only recent nesting records in the vicinity of these ponds indicate that one or two pairs have nested in some years in a small impoundment between pond A12 and the railroad tracks, north of the Alviso marina and well removed from Alviso Slough (Rogers, pers. comm., Mammoser, pers. comm.).

Cumulative Impacts. As discussed in Section 6.2.5.5, "Salt Evaporation Ponds," the combined Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project will not result in impacts on salt evaporation ponds. Therefore, no significant cumulative impacts on the western snowy plover or snowy plover habitat would occur as a result of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project.

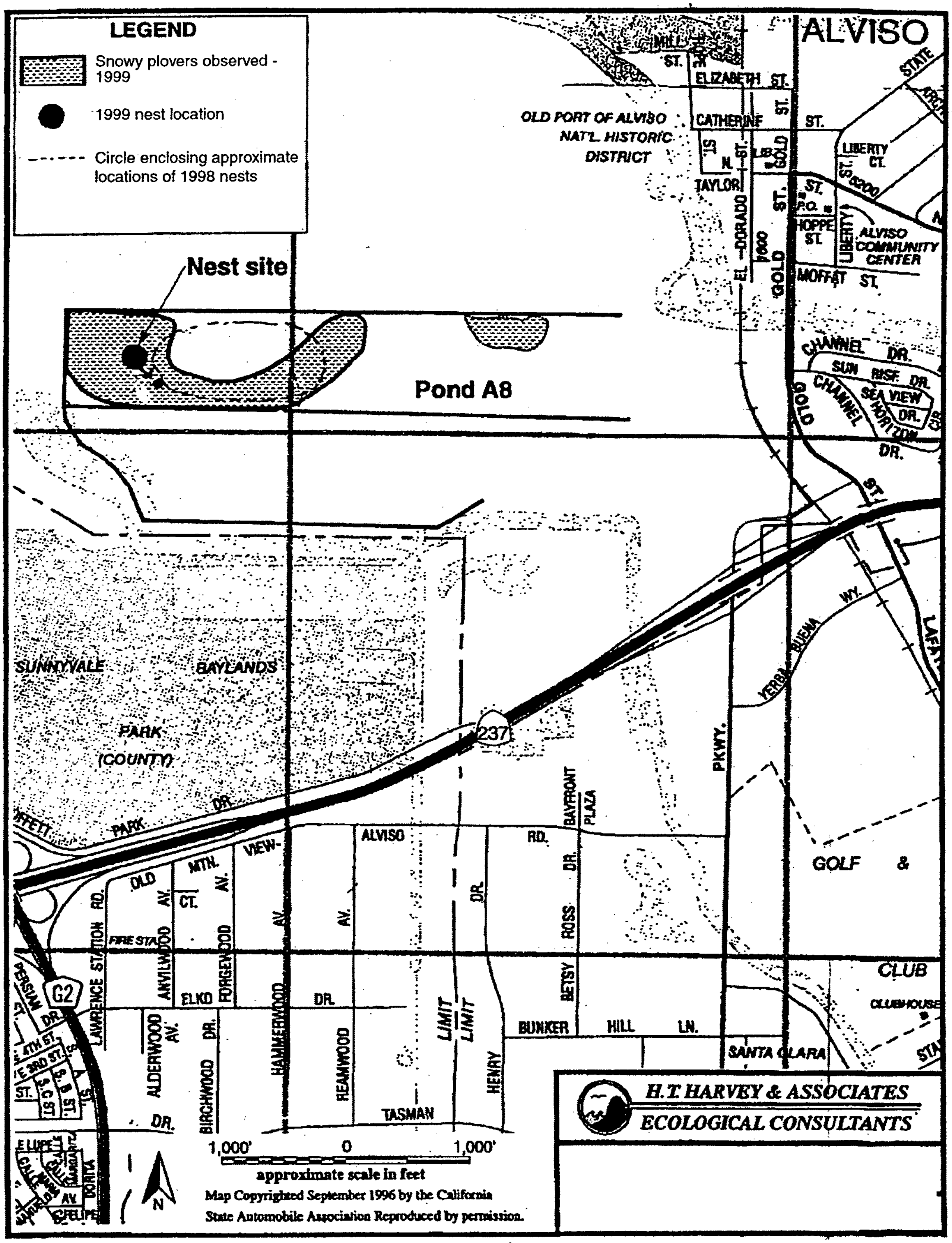


Figure 6.2-9. Western Snowy Plover Nest Sites - 1998 and 1999

Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of salt evaporation ponds as a result of floodflows may or may not change. Some adverse cumulative impacts on the western snowy plover may result if there are increases in the depth, frequency, and duration of inundation of salt evaporation ponds used by this species. The potential impacts of the Lower Guadalupe River Project on western snowy plover cannot be identified until the final design of the Lower Guadalupe River Project has been determined. If, for example, the Lower Guadalupe River Project includes a change in the 14,000 cfs capacity limitation at the Highway 237 bridge, levees are not raised, and there is no pumping of flood-waters from pond A8D, then the depth and duration of inundation of salt evaporation ponds from floodflows could increase beyond existing conditions. These changes could result in an adverse impact on the available nesting habitat for snowy plover within the salt evaporation ponds. However, it would be speculative to define potential impacts on the snowy plover before the final design of the Lower Guadalupe River Project has been determined.

Potential impacts will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

If a cumulative impact on the western snowy plover or its habitat, as a result of changes in hydrologic or hydraulic conditions due to the flood protection project, is identified in the BA for the Lower Guadalupe River Project, USFWS has requested that an analysis determine for the decision makers what portion of this cumulative impact, if any, is caused by the Guadalupe River Project with Bypass System Alternative. If some portion of an unexpected cumulative impact is shown to be a result of the Guadalupe River Project with Bypass System Alternative, the Corps, Sacramento District, will reinitiate consultation with USFWS on the Guadalupe River Project. In such a case, Corps policy and regulations exist that allow for additional mitigation to compensate for impacts proven to be a result of a completed project.

If a cumulative hydrologic or hydraulic impact were to be identified in the BA for the Lower Guadalupe River Project, events and actions would probably occur in the following sequence:

1. Following a BO rendered for the Lower Guadalupe River Project in which a cumulative impact is linked to the completed Guadalupe River Project with Bypass System Alternative, the Corps and SCVWD would review the findings of USFWS.
2. If the Corps and SCVWD concur with the findings of the BO, they would review mitigation needs and determine whether the costs of mitigation appear to be a normal part of the operation and maintenance requirements of the Guadalupe River Project with Bypass System Alternative or if such costs appear to be extraordinary and warrant Federal cost participation. If the costs are an operation and maintenance responsibility, SCVWD would be responsible for them. If the costs appear to warrant Federal participation, the Corps and SCVWD would prepare an authorization post change report to document the need and costs for mitigating that portion of the cumulative impact determined to be a result of the Guadalupe River Project with Bypass System Alternative.
3. The postauthorization change report would be submitted to the Chief of Engineers (if the changes to the project are modest) or to Congress (if the changes are substantial) for authorization of its recommendations.

4. After authorization, the Corps and SCVWD would jointly carry out the authorized mitigation.

5. Additional NEPA/CEQA documentation would be prepared as required.

Conservation Measures. No change in flood frequency or adverse impacts on western snowy plover habitat are expected to result from the Guadalupe River Project with Bypass System Alternative or the cumulative effects of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project. However, as a stipulation for issuing the BO on the Guadalupe River Project with Bypass System Alternative, USFWS has requested that the Corps and SCVWD ensure that floodwaters will be pumped out of salt evaporation pond A8D between January and May. Pumping will occur after flooding or when USFWS determines that snowy plover nests are at risk from inundation. The Corps and SCVWD have committed to coordinate with Cargill Corporation, the owner of the salt evaporation ponds, regarding these measures.

In addition, USFWS has requested that the Corps and SCVWD monitor floodflows and surface-water levels in Alviso Slough and in evaporation pond A8D. The purpose of the monitoring program is to verify whether the flood frequency or inundation period within pond A8D remains unchanged as a result of the construction of the Guadalupe River Project prior to coordination with USFWS in accordance with the Endangered Species Act and the Fish and Wildlife Act on the Lower Guadalupe River Project.

The Corps and SCVWD will ensure that a short-term habitat-monitoring program begins in 2001 and continues through the remaining construction phases of the Guadalupe River Project with Bypass System Alternative. Proposed short-term monitoring methods are outlined below and described in the MMP (Appendix 3); final short-term monitoring methods for the salt evaporation ponds will be developed in coordination with USFWS. Monitoring reports will be submitted to USFWS. Short-term monitoring will end when the Lower Guadalupe River Project has been completed and the Guadalupe River Project with Bypass System Alternative becomes operational. After the short-term monitoring is completed, water level monitoring may continue as a component of the Lower Guadalupe River Project MMP. This monitoring will depend on the results of consultation with USFWS on the Lower Guadalupe River Project. As described below, the short-term monitoring program for the western snowy plover will focus on flooding and surface-water level in Alviso Slough and in evaporation ponds.

Proposed Monitoring of Hydrologic Conditions in Alviso Slough Area. Streamflow in Alviso Slough can directly affect the depth and duration of flooding of the salt evaporation ponds. Changes in the depth and duration of flooding can affect the availability of the salt evaporation ponds for foraging and nesting by the snowy plover. Flooding of the salt evaporation ponds from other sources, however, such as Guadalupe Slough, is not related to the operation of the Guadalupe River Project.

Measurable Objectives. The average monthly depth and duration of flooding of salt evaporation pond A8 will not exceed that predicted by the HEC-RAS model of Alviso Slough using existing Guadalupe River streamflow data.

Monitoring Methods. Continuous surface-water level data will be collected in Alviso Slough at two locations: the Gold Street Bridge and midway between the Gold Street Bridge and the confluence of Alviso Slough with Coyote Creek. Continuous surface-water level

data will also be collected in Guadalupe Slough adjacent to evaporation pond A8D; these data are critical to assisting in isolating the impacts of construction and operation of the Guadalupe River Project. In addition, flow rates will be measured continuously at the Gold Street Bridge and Guadalupe Slough locations. The continuous recorders will include a vented pressure sensor and will collect data once every 10 minutes. A peak-stage recorder, which records the peak of the flood, will be placed at the crest of the weir on the levee between Alviso Slough and evaporation pond A8W. This site is the historical location of levee overtopping. Peak-stage recorders will also be placed in evaporation ponds A8W and A8D to track the depth of flooding. The Corps and SCVWD have committed to coordinate with Cargill regarding these measures.

The locations of each continuous recorder and peak-stage recorder will be surveyed and referenced to a stable benchmark and to each other. The continuous recorders and peak-stage recorders will be located using an existing horizontal datum and will be programmed to record water-surface elevation in feet relative to the National Geodetic Vertical Datum of 1929. Data will be downloaded from the continuous recorders once every 60 days. Data will be downloaded from the peak-stage recorders after each storm. The elevations of the continuous recorders and peak-stage recorders will be checked at the close of each year's data period relative to the benchmark and to each other. The entire length of the levee between evaporation ponds A8W and A8D will be surveyed to verify low spots. It is assumed that water depth and a description of operations in salt evaporation ponds A5 through A8 will be provided twice a year by Cargill to identify the operational baseline.

The depth and duration of flooding of the salt evaporation ponds will be determined by field observations, the analysis of the continuous water-level and flow data, and the analysis of the peak-stage data.

Remedial Actions. If the median monthly depth and duration of flooding of salt evaporation pond A8 plus or minus one standard deviation about the mean, exceed those predicted by the HEC-RAS model of Alviso Slough, the Corps and SCVWD will coordinate with USFWS to determine the cause of the change in depth and duration of flooding and whether additional steps are required to minimize impacts on western snowy plover. The Corps, in coordination with USFWS, will reinitiate consultation if changes in hydraulic conditions continue, if they affect listed species, and if they are determined to be a result of the Guadalupe River Project with Bypass System Alternative.

6.2.6.4 California Clapper Rail

The California clapper rail is federally listed as endangered and State listed as threatened. Loss and fragmentation of coastal and bay wetlands have contributed to the decline of this species. Very high tides have caused nesting failure and have increased the likelihood of predation. The California clapper rail is a marsh bird with a short tail and short, rounded wings. It is about 14.5 inches in length. The California clapper rail is a year-round resident in the San Francisco Bay area, where it breeds in salt and brackish marshes along the edge of San Francisco Bay. It is absent from or occurs only sporadically, mostly during the nonbreeding season, in historical breeding areas elsewhere on the central California coast. Its breeding season is from mid-March through July, with peaks observed from early May through late June.

Habitat Requirements. California clapper rails are most abundant in extensive salt marshes dominated by California cordgrass, pickleweed, and marsh gumplant (*Grindelia stricta*) where numerous secondary tidal channels are present (Harvey, 1980). Nests are placed in or under cordgrass, gumplant, pickleweed, salt grass, or tidal wrack (De Groot, 1927, Evens and Page, 1983, Harvey, 1980, Foerster et al., 1990). Most foraging occurs on exposed mud or in vegetation along the margins of tidal channels; secondary tidal channels are used the most frequently (Shuford, 1993). In winter, clapper rails forage primarily in cordgrass-dominated habitat in the lower marsh (Shuford, 1993), although tall vegetation at the edges of the upper marsh provides important cover during high winter tides. California clapper rails also breed in brackish marshes, especially those dominated by alkali bulrush (*Scirpus robustus*). However, the importance of these marshes to clapper rail populations is not well understood (H. T. Harvey & Associates 1989, 1990b, 1991a, 1991b, Collins et al., 1994).

Occurrence in the Guadalupe River Watershed. Breeding-season surveys of south San Francisco Bay marshes by Gill (1979) found clapper rails in salt marshes west of Drawbridge, which is immediately north of Coyote Slough. Gill found no clapper rails, however, in the more brackish marshes to the east, although clapper rails had been recorded in these brackish marshes during winter. Intensive surveys by H. T. Harvey & Associates (1989) also detected no clapper rails in the brackish marshes east of Drawbridge during the 1989 breeding season. These surveys found clapper rails west of Drawbridge to be associated more strongly with cordgrass-dominated habitats than with alkali bulrush, but also documented breeding clapper rails in a wide variety of plant associations. Surveys of the same areas in winter 1989–90 and during the breeding season of 1990 found a number of clapper rails occupying several brackish, bulrush-dominated marshes located well to the east of Drawbridge (H. T. Harvey & Associates, 1990a, 1990b). In addition, clapper rails were found in nearly pure stands of alkali bulrush along Guadalupe Slough in 1990 and 1991 (H. T. Harvey & Associates, 1991a, 1991b).

Few surveys for clapper rails have been conducted specifically in Alviso Slough. Most surveys for this species in the southern San Francisco Bay area, like those conducted by Harvey (1980), Moss (1980), and Foerster et al. (1990), have focused on more expansive marshes. Nevertheless, several surveys have documented clapper rails along Alviso Slough. In the early 1970s, Gill (1979) recorded clapper rails along the larger marshes fringing Guadalupe and Alviso Sloughs. Surveys of a number of south San Francisco Bay locations by H. T. Harvey & Associates (1989) included breeding-season surveys in a 26-acre section of transitional salt-brackish marsh along Alviso Slough, approximately 2 miles upstream from the mouth of the slough. Five clapper rails found there included one pair using a narrow strip of pure cordgrass along the main slough, another pair using a mixture of cordgrass and alkali bulrush, and a single individual in a pure stand of alkali bulrush (Figure 6.2-10). Two pairs were found occupying the same marsh in spring 1990 (H. T. Harvey & Associates, 1990b)(Figure 6.2-10). Winter surveys by Harvey (1980) found no clapper rails in the bulrush-dominated habitat along upper Alviso Slough but did detect two individuals in mixed cordgrass-pickleweed salt marsh approximately 1.6 miles downstream from the Alviso marina. Annual clapper-rail surveys conducted each winter by the San Francisco Bay National Wildlife Refuge typically omit most of Alviso Slough, although these surveys did detect one individual approximately 1.7 miles downstream from the Alviso marina on December 10, 1993, and three individuals at the mouth of the slough on January 1, 1995 (J. Albertson, pers. comm.).

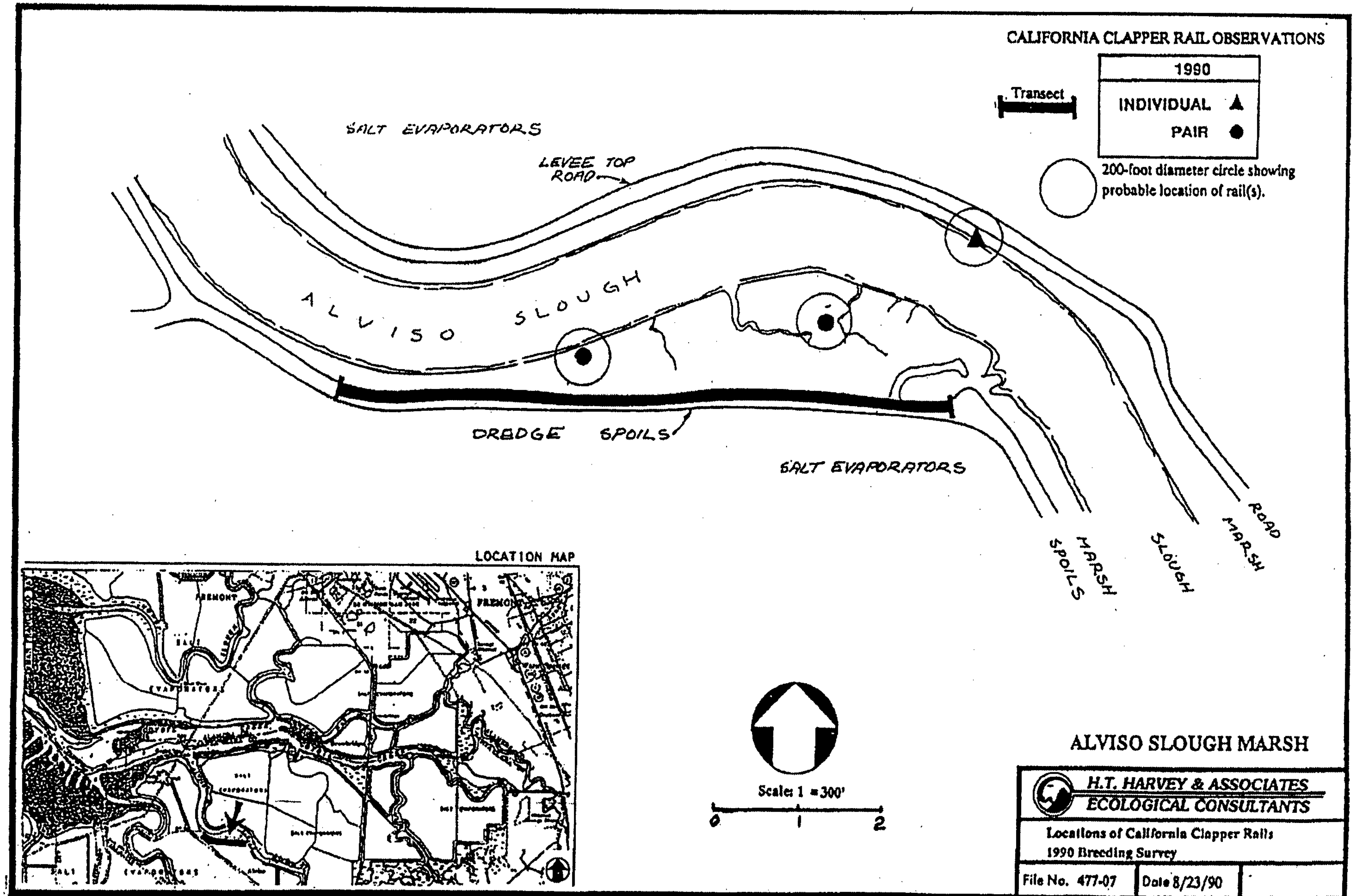


Figure 6.2-10. California Clapper Rail Survey Results -1990

Few clapper rails have been recorded along the extreme upper reaches of Alviso Slough, between Gold Street and the vicinity of the Alviso marina. In these areas, both plant associations and interstitial salinity measurements are typical of freshwater, rather than brackish, systems (H. T. Harvey & Associates, 1999b). From 1989 to 1998, summer and fall botulism surveys conducted semiannually along Alviso Slough near the Alviso marina by the SFBBO produced only one clapper rail record (October 1, 1997) during a total of 166 surveys (San Francisco Bay Bird Observatory, unpublished reports). A single individual was heard by an H. T. Harvey & Associates ornithologist immediately below the Gold Street Bridge in Alviso during spring 1997; this finding represents the uppermost record along Alviso Slough. Habitat along much of middle and lower Alviso Slough is of moderate to low quality for breeding clapper rails. SCVWD conducted winter surveys in 1996 and 1997 for clapper rails from Highway 237 to Alviso Slough. No clapper rails were recorded (Padley, pers. comm.).

Cumulative Impacts. As discussed in Section 6.2.5.4, "Salt Marsh and Wetlands – Alviso Slough," the combined Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project will not result in impacts on wetlands in Alviso Slough. Therefore, no significant cumulative impacts on the clapper rail or clapper rail habitat would occur as a result of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project.

Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of marsh habitat in Alviso Slough due to floodflows may or may not change. Some adverse cumulative impacts may result if there are increases in the depth, frequency, and duration of inundation of marsh habitat in Alviso Slough used by the clapper rail. The potential impacts of the Lower Guadalupe River Project on California clapper rail cannot be identified until the final design of the Lower Guadalupe River Project has been determined. If, for example, the Lower Guadalupe River Project includes a change in the 14,000 cfs capacity limitation at the Highway 237 bridge and levees are not raised or a flood bypass is not provided, then the depth and duration of inundation of slough benches from floodflows could increase beyond existing conditions. These changes could result in an adverse impact on the marsh habitat in Alviso Slough used by the clapper rail for nesting and foraging. However, it would be speculative to define any potential impact on marsh habitat before the final design of the Lower Guadalupe River Project has been determined. Potential impacts on marsh habitat will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

If a cumulative impact on the clapper rail or its habitat, as a result of changes in hydrologic or hydraulic conditions due to the flood protection projects, is identified in the BA for the Lower Guadalupe River Project, USFWS has requested that an analysis determine for the decision makers what portion of this cumulative impact, if any, is caused by the Guadalupe River Project with Bypass System Alternative. If some portion of an unexpected cumulative impact is shown to be a result of the Guadalupe River Project with Bypass System Alternative, the Corps, Sacramento District, will reinitiate consultation with USFWS on the Guadalupe River Project. In such a case, Corps policy and regulations exist that can allow for additional mitigation to compensate for impacts proven to be a result of a completed project.

If a cumulative hydrologic or hydraulic impact were to be identified in the BA for the Lower Guadalupe River Project, events and actions would probably occur in the following sequence:

1. Following a BO rendered for the Lower Guadalupe River Project in which a cumulative impact is linked to the completed Guadalupe River Project with Bypass System Alternative, the Corps and SCVWD would review the findings of USFWS.
2. If the Corps and SCVWD concur with the findings of the BO, they would review mitigation needs and determine whether the costs of mitigation appear to be a normal part of the operation and maintenance requirements of the Guadalupe River Project with Bypass System Alternative or if such costs appear to be extraordinary and warrant Federal cost participation. If the costs are an operation and maintenance responsibility, SCVWD would be responsible for them. If the costs appear to warrant Federal participation, the Corps and SCVWD would prepare a postauthorization change report to document the need and costs for mitigating that portion of the cumulative impact determined to be a result of the Guadalupe River Project with Bypass System Alternative.
3. The postauthorization change report would be submitted to the Chief of Engineers (if the changes to the project are modest) or to Congress (if the changes are substantial) for authorization of its recommendations.
4. After authorization, the Corps and SCVWD would jointly carry out the authorized mitigation.
5. Additional NEPA/CEQA documentation would be prepared as required.

Conservation Measures. No change in flood frequency or adverse impacts on California clapper rail habitat are expected to result from the Guadalupe River Project with Bypass System Alternative or the cumulative effects of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project.

However, as a stipulation for issuing the BO on the Guadalupe River Project with Bypass System Alternative, USFWS has requested that the Corps and SCVWD monitor clapper rail habitat in the Alviso Slough area. The purpose of the monitoring program is to add to baseline data and to determine whether the habitat in the salt marsh changes as a result of construction of the Guadalupe River Project with Bypass System Alternative prior to coordination with USFWS in accordance with the Endangered Species Act and the Fish and Wildlife Coordination Act on the Lower Guadalupe River Project. Available information indicates that the dominant plant associations in the tidal marsh habitat along Alviso Slough vary with the type of water year (dry or wet). Habitat in and adjacent to Alviso Slough has been monitored for more than 10 years (H. T. Harvey & Associates, 1999b). The data from this monitoring will provide a baseline for identifying habitat changes.

The Corps and SCVWD will ensure that a short-term habitat-monitoring program will begin in 2001 and continue through the remaining construction phases of the Guadalupe River Project with Bypass System Alternative. Proposed short-term monitoring methods are outlined below and described in the MMP (Appendix 3). Final short-term monitoring methods for the Alviso Slough area will be developed in coordination with USFWS, and monitoring reports will be submitted to USFWS. Short-term monitoring will end after the Lower Guadalupe River Project has been completed and the Guadalupe River Project with

Bypass System Alternative is operational. After short-term monitoring has been completed, monitoring of clapper rail habitat in the Alviso Slough area may continue as a component of the Lower Guadalupe River Project MMP, depending on the results of consultation with USFWS on the Lower Guadalupe River Project.

The proposed short-term clapper rail monitoring program will focus on the following key habitat indicators for the clapper rail:

- Dominant plant species and habitat types in Alviso Slough
- Floodflows, surface-water levels, and salinity in Alviso Slough

Proposed Monitoring of Dominant Plant Species and Habitat Types in Alviso Slough. Changes in the dominant plant species and marsh habitat types in Alviso Slough can directly affect habitat for the California clapper rail and salt marsh harvest mouse. A significant loss of salt marsh habitat can negatively affect the clapper rail and salt marsh harvest mouse.

Measurable Objective. The rate of conversion of salt marsh to other habitat types as a result of the construction of the Guadalupe River Project with Bypass System Alternative must not exceed the average annual rate of conversion during the past 10 years (1989 to 1999).

Monitoring Methods. The following is a summary of monitoring methods; see the MMP (Appendix 3) for a more detailed discussion of methodology. Color infrared aerial photographs will be taken annually of Alviso Slough from the Alviso UPRR Bridge to the confluence with Coyote Creek. Photographs will be taken from an altitude of approximately 8,500 feet (1.6 miles) using a 6-inch (15.2-centimeter) camera lens. The flight to obtain the aerial photographs will be scheduled between June 15 and July 31 during negative tidal elevation and 30- to 45-degree solar altitude.

Field surveys and analysis of vegetation in Alviso Slough will include mapping of plant associations. Topographic features, marsh boundaries, and tentative vegetation associations, based on color signatures, will be mapped prior to ground truthing. Plant associations will be summarized by dominant-species categories. For example, the alkali bulrush peppergrass association is an alkali-bulrush dominant-species category. These dominant-species categories will then be assigned to one of four habitat types: salt marsh, brackish marsh, freshwater marsh, or upland. The field vegetation maps (acetate overlays) will be scanned and electronically digitized. Plant-association acreages and color-coded figures will be generated in a GIS. Area comparisons between dominant-species categories and habitat types between study years will be made. Areas of significant change will be determined and presented as a habitat-change map.

Remedial Actions. If a change in habitat conditions in the Alviso Slough salt marsh is noted, the Corps and SCVWD will coordinate with USFWS to determine the cause of the habitat changes and whether additional steps are required to minimize impacts on the California clapper rail. The Corps, in coordination with USFWS, will reinitiate consultation if changes in salt marsh habitat continue, if the changes affect listed species, and if the changes are determined to be a result of the Guadalupe River Project with Bypass System Alternative.

Proposed Continuous Water Level and Salinity Monitoring. Streamflow in Alviso Slough directly affects the depth and duration of flooding of the marsh surface and the salinity of the surface water. These changes can affect the distribution of plant species along the marshes of Alviso Slough.

Measurable Objectives. The average monthly depth and duration of flooding of the marsh surface will not exceed that predicted by the HEC-RAS model of Alviso Slough using existing Guadalupe River streamflow data. Average surface-water salinity in Alviso Slough will not be more than 20 percent lower than the 1999-2000 baseline data.

Monitoring Methods. Continuous surface-water level and salinity data will be collected in Alviso Slough at two locations: the Gold Street Bridge and midway between the Gold Street Bridge and the confluence of Alviso Slough and Coyote Creek. Continuous surface-water level and salinity data will also be collected in Guadalupe Slough adjacent to evaporation pond A8D. Flow rates will be measured continuously at the Gold Street Bridge and Guadalupe Slough locations. The continuous recorders will include a vented pressure sensor and will collect data once every 10 minutes.

The locations of each continuous recorder will be surveyed and referenced to a stable benchmark and to each other. The continuous recorders will be located using an existing horizontal datum and will be programmed to record water-surface elevation in feet relative to the National Geodetic Vertical Datum of 1929. Data will be downloaded from the continuous recorders once every 60 days. The elevations of the continuous recorders will be checked at the close of each year's data period relative to the benchmark and to each other.

The depth and duration of flooding over the marsh surface will be determined from the continuous water-level and flow data. Continuous salinity data will be summarized and compared to the Guadalupe River flow rates at the Gold Street Bridge.

Remedial Actions. If the median monthly depth and duration of flooding of the salt marshes plus or minus one standard deviation exceed those predicted by the HEC-RAS model of Alviso Slough, the Corps and SCVWD will coordinate with USFWS to determine the cause of the change in depth and duration of flooding and whether additional steps are required to minimize impacts on the California clapper rail. The Corps, in coordination with USFWS, will reinitiate consultation if changes in hydraulic conditions continue, if the changes affect listed species, and if the changes are determined to be a result of the Guadalupe River Project with Bypass System Alternative.

6.2.6.5 Salt Marsh Harvest Mouse

The salt marsh harvest mouse is both federally listed and State listed as endangered. This species has declined because of loss and fragmentation of habitat as a result of development, changes in vegetation caused by upstream freshwater discharges, and subsidence-related causes. The salt marsh harvest mouse is about 4.6 to 6.9 inches long and weighs between 8 and 12 grams. The salt marsh harvest mouse is known to occur in the San Francisco Bay area.

Habitat Requirements. The salt marsh harvest mouse inhabits pickleweed marshes of the San Francisco Bay. This species is most abundant in deep, dense pickleweed in salt marshes; pickleweed that is not submerged at high tide provides refuge for this species during high winter tides (Shellhammer et al., 1982). Although the salt marsh harvest mouse makes some

use of grasses and salt-tolerant forbs at the upper margins of salt and brackish marshes, it is closely tied to the cover of dense pickleweed, and it makes little use of pure bulrush or cordgrass stands (Wondolleck et al., 1976, Shellhammer, 1977). Salt marsh harvest mice inhabit both marshes that are open to tidal action and diked marshes, provided that suitable habitat is present. Section 6.2.5.4, "Salt Marsh and Wetlands – Alviso Slough," provides a description of tidal-marsh habitats along the length of Alviso Slough.

Occurrence in the Guadalupe River Watershed. Several trapping studies have documented the presence of salt marsh harvest mice in pickleweed-dominated marshes in the Alviso area, such as New Chicago Marsh, Triangle Marsh, and Newby Island (Rice, 1974, Zetterquist, 1976, Muench, 1985, Shellhammer et al., 1982, Shellhammer et al., 1985, H. T. Harvey & Associates, 1990c). In some of these locations, salt marsh harvest mice have been captured sporadically or in low numbers.

Nevertheless, this species has been captured fairly consistently in areas providing high-quality pickleweed habitat, and all such habitat in the Alviso area provides at least potentially suitable salt marsh harvest mouse habitat. Trapping surveys found small numbers of salt marsh harvest mice in narrow strips of pickleweed adjacent to bulrush-dominated brackish marsh, although they make little use of adjacent bulrush-dominated areas (H. T. Harvey & Associates, 1990c).

No trapping surveys for salt marsh harvest mice have been conducted along Alviso Slough proper. However, suitable habitat is present in pickleweed-dominated salt marsh along the lower reaches of the slough, extending approximately 3,300 feet upstream from the confluence of Alviso Slough and Coyote Creek (Figure 6.2-6). The presence of this habitat indicates that salt marsh harvest mice are likely to occur in these areas. Along the middle reaches of Alviso Slough, brackish marsh habitat extends approximately 14,000 feet upstream from the salt marsh habitat (Figure 6.2-6). In this area, pickleweed is more sparsely distributed; where present, it is commonly restricted to a narrow, interrupted band at the toe of the levee slope. Because salt marsh harvest mice are known to be present in areas of similar habitat on Newby Island (H. T. Harvey & Associates, 1990c), they are assumed to be present in narrow strips of pickleweed adjacent to bulrush-dominated brackish marsh along Alviso Slough, although they are probably absent from the adjacent bulrush stands (Figure 6.2-11). In some areas along the lower and middle reaches of Alviso Slough, dense, tall vegetation is present on slopes, providing refuge during high tides for salt marsh harvest mice present in the adjacent marshes. The extreme upper reaches of Alviso Slough from the Gold Street Bridge downstream for approximately 3,800 feet are characterized by freshwater marsh habitat (Figure 6.2-6). Owing to the paucity and sparse distribution of pickleweed along the extreme upper reaches of Alviso Slough (H. T. Harvey & Associates, 1990c), salt marsh harvest mice are probably absent from these areas.

Cumulative Impacts. As discussed in Section 6.2.5.4, "Salt Marsh and Wetlands – Alviso Slough," the combined Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project will not result in impacts on marsh habitat in Alviso Slough. Therefore, no significant cumulative impacts on the salt marsh harvest mouse would occur as a result of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project.

Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of marsh habitat in Alviso Slough as a result of floodflows may or may not change. Some adverse cumulative impacts on the

salt marsh harvest mouse may result if there are increases in the depth, frequency, and duration of inundation of marsh habitat in Alviso Slough used by this species. The potential impacts of the Lower Guadalupe River Project on the salt marsh harvest mouse cannot be identified until the final design of the Lower Guadalupe River Project has been determined. If, for example, the Lower Guadalupe River Project includes a change in the 14,000 cfs capacity limitation at the Highway 237 bridge and levees are not raised or a flood bypass is not provided, then the depth and duration of inundation of slough benches from floodflows could increase beyond existing conditions. These changes could result in an adverse impact on the marsh habitat in Alviso Slough used by the salt marsh harvest mouse for nesting and foraging. However, it would be speculative to define potential impacts before the final design of the Lower Guadalupe River Project has been determined. Potential impacts will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

If a cumulative impact on salt marsh harvest mouse or its habitat as a result of changes in hydrologic or hydraulic conditions due to the flood protection projects, is identified in the BA for the Lower Guadalupe River Project, USFWS has requested that an analysis determine for the decision makers what portion of this cumulative impact, if any, is caused by the Guadalupe River Project with Bypass System Alternative. If some portion of an unexpected cumulative impact is shown to be a result of the Guadalupe River Project with Bypass System Alternative, the Corps, Sacramento District, will reinitiate consultation with USFWS on the Guadalupe River Project. In such a case, Corps policy and regulations exist that can allow for additional mitigation to compensate for impacts proven to be a result of a completed project.

If a cumulative hydrologic or hydraulic impact were to be identified in the BA for the Lower Guadalupe River Project, events and actions would probably occur in the following sequence:

1. Following a BO rendered for the Lower Guadalupe River Project in which a cumulative impact is linked to the completed Guadalupe River Project with Bypass System Alternative, the Corps and SCVWD would review the findings of USFWS.

2. If the Corps and SCVWD concur with the findings of the BO, they would review mitigation needs and determine whether the costs of mitigation appear to be a normal part of the operation and maintenance requirements of the Guadalupe River Project with Bypass System Alternative or if such costs appear to be extraordinary and warrant Federal cost participation. If the costs are an operation and maintenance responsibility, SCVWD would be responsible for them. If the costs appear to warrant Federal participation, the Corps and SCVWD would prepare a postauthorization change report to document the need and costs for mitigating that portion of the cumulative impact determined to be a result of the Guadalupe River Project with Bypass System Alternative.

3. The authorization post change report would be submitted to the Chief of Engineers (if the changes to the project are modest) or to Congress (if the changes are substantial) for authorization of its recommendations.

4. After authorization, the Corps and SCVWD would jointly carry out the authorized mitigation.

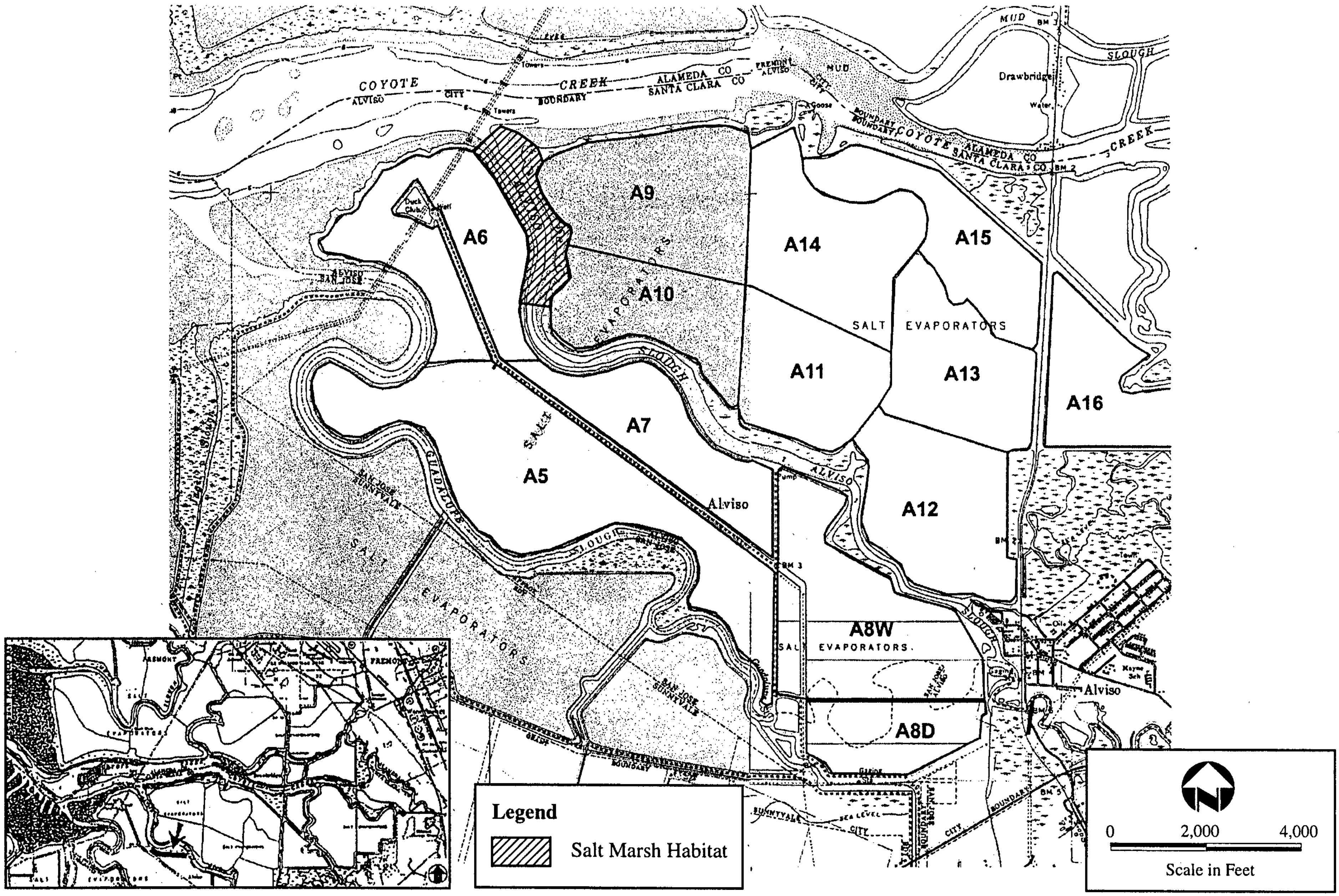


Figure 6.2-11. Prime Salt Marsh Harvest Mouse Habitat in Alviso Slough - Lower Guadalupe/Alviso Slough Area

5. Additional NEPA/CEQA documentation would be prepared as required.

Conservation Measures. No change in flood frequency or adverse impacts on salt marsh harvest mouse habitat are expected to result from construction of the Guadalupe River Project with Bypass System Alternative or the cumulative effects of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project.

However as a stipulation for issuing the BO on the Guadalupe River Project with Bypass System Alternative, USFWS has requested that the Corps and SCVWD monitor salt marsh harvest mouse habitat in the Alviso Slough area. The purpose of the monitoring program is to add to baseline data and to determine whether the habitat in the salt marsh changes as a result of construction of the Guadalupe River Project with Bypass System Alternative prior to coordination with USFWS in accordance with the Endangered Species Act and the Fish and Wildlife Coordination Act on the Lower Guadalupe River Project. Available information indicates that the dominant plant associations in the tidal marsh habitat along Alviso Slough vary with the type of water year (dry or wet). Habitat in and adjacent to Alviso Slough has been monitored for more than 10 years (H. T. Harvey & Associates, 1999b). The data from this monitoring will provide a baseline for identifying habitat changes.

The Corps and SCVWD will ensure that a short-term habitat-monitoring program will begin in 2000 and continue through the remaining construction phases of the Guadalupe River Project with Proposed Project. Proposed short-term monitoring methods are outlined in Section 6.2.6.4, "California Clapper Rail," and described in the MMP (Appendix 3). Final short-term monitoring methods for the Alviso Slough area will be developed in coordination with USFWS, and monitoring reports will be submitted to USFWS. Short-term monitoring will end after the Lower Guadalupe River Project has been completed and the Guadalupe River Project with Bypass System Alternative is operational. Completion of the Lower Guadalupe River Project is scheduled for 2002. After short-term monitoring has been completed, monitoring of salt marsh harvest mouse habitat in the Alviso Slough area may continue as a component of the Lower Guadalupe Project MMP, depending on the results of consultation with USFWS on the Lower Guadalupe River Project.

The proposed short-term monitoring program for the salt marsh harvest mouse will focus on two key habitat indicators for the salt marsh harvest mouse:

- Dominant plant species and habitat types in Alviso Slough
- Floodflows, surface-water levels, and salinity in Alviso Slough

For details of the monitoring program, see Section 6.2.6.4, " California Clapper Rail – Conservation Measures."

6.2.7 Cumulative Impacts on Fish

The cumulative impacts on fish and fish habitat discussed in this section focus on the effects of the Guadalupe River Project with Bypass System Alternative and other major projects in the watershed listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analysis." The cumulative impacts on fish described below are based on the description of cumulative changes in hydrologic and hydraulic conditions in Section 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions," river morphology in Section 6.2.3, "Cumulative Impacts on River Geomorphology," water quality in Section 6.2.4,

"Cumulative Impacts on Water Quality," and SRA cover vegetation in Section 6.2.5, "Cumulative Impacts on Biological Resources – Vegetation."

6.2.7.1 Hydraulic and Hydrologic Impacts

The following analysis of cumulative impacts on fish and fish habitat as a result of cumulative changes to hydraulic and hydrologic conditions focuses on those projects that were identified in Section 6.2.2, "Cumulative Impacts on Hydrologic and Hydraulic Conditions," as principal contributors to the potential cumulative changes in hydraulic and hydrologic conditions in the Guadalupe River watershed: the Upper Guadalupe River Project, Guadalupe River Project with Bypass System Alternative, and Lower Guadalupe River Project.

Flows in the Guadalupe River are usually less than 100 cfs during the December through April wet season and less than 10 cfs from May through November (Appendix 1A). Fish habitat that supports migration, spawning, and rearing is most sensitive to changes in flow when flows are low because water depth and velocity reach critical levels for fish at low flows; that is, the water becomes too shallow to provide fish passage and cover and velocity becomes insufficient to cleanse and oxygenate the gravel that supports fish spawning and production of organisms important as food for fish. The Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project would not affect the frequency or duration of low- to medium-range flows in the natural channel because flows would not be diverted into flood bypasses until they reach approximately 1,500 cfs (Section 6.2.2.3, "Hydrologic and Hydraulic Conditions"). Effects on the timing, magnitude, frequency, and duration of low- to medium-range flows would be avoided, and the depth and velocity conditions needed to support fish migration, spawning, and rearing would not be substantially affected.

As described in Section 5.6.4.1, "Adult and Juvenile Anadromous Fish Migration," the changes in velocities in Segments 1, 2, and 3 of the Guadalupe River Project with Bypass System Alternative would not affect migration of anadromous fish. In addition, velocities in the Bypass System Alternative and the Woz Way to Park Avenue bypasses would not result in adverse effects on migrating anadromous fish. The bypasses in the Upper Guadalupe River Project would operate in a fashion similar to that of the Bypass System Alternative bypass and would not result in adverse effects on migrating anadromous fish (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 2000a).

The bypasses that are part of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project would actually result in a reduction in the maximum flow velocities in the natural channel in the bypass reaches during high flow conditions. The natural channel in the bypass reaches is expected to provide refuge for fish during high flow conditions. The combined Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project will therefore not result in cumulative adverse impacts on fish and fish habitat from changes in hydraulic and hydrologic conditions in the Guadalupe River watershed.

The potential impact of the Lower Guadalupe River Project on fish and fish habitat as a result of changes in hydraulic and hydrologic conditions cannot be identified until the final design of the Lower Guadalupe River Project has been determined. However, it is possible that some cumulative impacts may result. Any potential impacts that the Lower Guadalupe

River Project may have on fish and fish habitat will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

6.2.7.2 Channel Erosion and Deposition Impacts

The following analysis of cumulative impacts on fish and fish habitat as a result of cumulative changes in channel erosion and deposition focuses on those projects that were identified in Section 6.2.3, "Cumulative Impacts on River Geomorphology," as principal contributors to the potential cumulative changes in channel erosion and deposition in the Guadalupe River watershed: the Guadalupe Creek Restoration Project, Upper Guadalupe River Project, Guadalupe River Project with Bypass System Alternative, and Lower Guadalupe River Project.

The Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project would increase the total volume of water conveyed downstream during high flow conditions (Section 6.2.2, "Hydraulic and Hydrologic Conditions") and could affect erosion and deposition of sediment in localized areas of the river channel as a result of increased velocities (Section 6.2.3, "Cumulative Impacts on River Geomorphology"). The Guadalupe River Project with Bypass System Alternative, Upper Guadalupe River Project, and Guadalupe Creek Restoration Project include channel feature designs that will protect the overall channel from erosion. Such features include invert stabilization structures, rock weirs, and biotechnical bank stabilizers (Section 6.2.1, "Projects Addressed in the Cumulative Impact Analysis"). Channel maintenance flows and gravel-flushing flows will remain in the natural channel to maintain channel form and gravel quality. Therefore, the depth of riffles, flow velocity in riffle areas, spawning gravel occurrence, and the distribution and structure of pools, riffles, runs, and backwaters in the Guadalupe River watershed are not expected to be substantially affected by erosion and deposition (Section 6.2.3, "Cumulative Impacts on River Geomorphology"). The combined Guadalupe River Project with Bypass System Alternative, Upper Guadalupe River Project, and Guadalupe Creek Restoration Project will not result in significant cumulative adverse impacts from changes in erosion and deposition in the Guadalupe River watershed (Section 6.2.3, "Cumulative Impacts on River Geomorphology"). The cumulative impacts of changes in erosion and deposition on fish and fish habitat in the Guadalupe River watershed are therefore expected to be less than significant.

The potential impact of the Lower Guadalupe River Project on fish and fish habitat as a result of changes in channel erosion and deposition cannot be identified until the final design of the Lower Guadalupe River Project has been determined. However, it is possible that some cumulative impacts may result. Any potential impacts that the Lower Guadalupe River Project may have on fish and fish habitat will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

6.2.7.3 River Morphology Impacts

The following analysis of cumulative impacts on fish and fish habitat as a result of cumulative changes to river morphology focuses on those projects that were identified in Section 6.2.3, "Cumulative Impacts on River Geomorphology," as principal contributors to the potential cumulative changes in river morphology: Guadalupe Creek Restoration Project, Upper Guadalupe River Project, Guadalupe River Project with Bypass System Alternative, Lower Guadalupe River Project, and Santa Clara Valley Water District Fish Ladder Construction Program.

The Guadalupe River Project with Bypass System Alternative, Upper Guadalupe River Project, and Guadalupe Creek Restoration Project include grading, channel widening, and channel armoring activities (Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses"). These activities would affect fish habitat, including the occurrence of gravel and the distribution and structure of pools, riffles, runs, and backwaters (Section 6.2.3, "Cumulative Impacts on the River Geomorphology"). However, low-flow channel structures in areas of river-bottom armoring, invert stabilization structures in the natural channel, spawning gravel replacement, SRA cover vegetation replacement, and other environmental commitments would reestablish fish habitat values (Section 3.4.2, "Construction Features," Section 3.4.3, "Environmental Commitments," and Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses"). The combined Guadalupe River Project with Bypass System Alternative, Upper Guadalupe River Project, and Guadalupe Creek Restoration Project will not result in significant cumulative adverse impacts from changes in river morphology in the Guadalupe River watershed (Section 6.2.3, "Cumulative Impacts on River Geomorphology"). The cumulative adverse impacts on anadromous fish migration, spawning gravel, and rearing habitat in the Guadalupe River watershed would be avoided, minimized, and mitigated. The potential impact of the Lower Guadalupe River Project on fish and fish habitat resulting from changes in river morphology cannot be identified until the final design of the Lower Guadalupe River Project has been determined. However, it is possible that some cumulative impacts may result. Any potential impacts that the Lower Guadalupe River Project may have on fish and fish habitat will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

The Guadalupe River Project with Bypass System Alternative, Upper Guadalupe River Project, and Santa Clara Valley Water District Fish Ladder Construction Program include actions that would remove or modify physical barriers to fish passage (Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses"). Passage improvements associated with the Guadalupe River Project with Bypass System Alternative include removal of the USGS gage located near the St. John Street Bridge and relocation of an exposed gas and sewer line that crosses the river near Old Julian Street Bridge (Section 3.4.3.2, "Environmental Commitments – Measures to Compensate for Adverse Project Effects"). The Upper Guadalupe River Project and the Santa Clara Valley Water District Fish Ladder Construction Program will provide for fish passage in the locations of several structures on the Guadalupe River, Guadalupe Creek, and Alamitos Creek (Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses").

Because of the improvements to fish passage conditions and the environmental commitments included as part of the projects in the Guadalupe River watershed, cumulative impacts on fish migration, spawning, and rearing would be less than significant. The cumulative effects are potentially beneficial to anadromous species because passage improvements will provide for access to a minimum of an additional 10.9 miles of spawning and rearing habitat on Alamitos Creek and Guadalupe Creek.

6.2.7.4 Suspended Solids and Toxic Constituents Impacts

The introduction of suspended solids and toxic constituents to the Guadalupe River during and after construction of the Guadalupe River Project with Bypass System Alternative and other major projects listed in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analyses," would be avoided and minimized (Section 6.2.4, "Cumulative Impacts on Water Quality"). Adverse effects on fish species would therefore not occur.

Implementation of the Guadalupe River watershed flood protection projects and the Guadalupe Creek Restoration Project is expected to result in the following:

- No change in the amount or rate of sediments entering the Guadalupe River from sources such as surface runoff and storm drains
- A reduction in net erosion caused by peak flow conveyance in the Guadalupe River system
- No change and a potential reduction in the overall rate of erosion and sediment deposition on a watershed scale

Cumulative adverse effects on fish species due to erosion or sediment deposition would be less than significant.

The flood protection projects also would not affect the source or input of mercury into the system. Therefore, the existing mercury budget for the Guadalupe watershed would not increase as a result of implementation of the projects (Section 6.2.4.3, "Toxic Constituents – Mercury"). In addition, there is no evidence to suggest that operation of the flood protection projects and the Guadalupe Creek Restoration Project would increase aquatic organism exposure to bioavailable mercury. To the contrary, the projects would discourage the development of instream conditions such as wetlands or other anoxic, high sulfate, low pH, high organic matter aquatic environments that would be conducive to enhanced methylation. By creating a better-defined low-flow channel, the Guadalupe River Project with Bypass System Alternative, the Upper Guadalupe River Project, and the Guadalupe Creek Restoration Project would create more concentrated, less stagnant flows, thereby resulting in reduced anoxic conditions. Cumulative adverse effects on fish species and aquatic organisms would be less than significant.

6.2.7.5 Water Temperature and Dissolved Oxygen Impacts

The following analysis of cumulative impacts on fish and fish habitat as a result of cumulative changes to water temperatures and dissolved oxygen concentrations focuses on those projects that were identified in Section 6.2.4, "Cumulative Impacts on Water Quality," as principal contributors to the potential cumulative changes in water temperatures and dissolved oxygen concentrations in the Guadalupe River watershed: the Guadalupe Creek Restoration Project, Upper Guadalupe River Project, Guadalupe River Project with Bypass System Alternative, and Lower Guadalupe River Project.

Water temperatures in the Guadalupe River are often less than optimal and sometimes lethal to chinook salmon and steelhead, especially during the summer and early fall months (Section 4.6.3.5, "Water Temperature"; Appendix 1A). Removal of SRA cover vegetation during construction of the Guadalupe River Project with Bypass System Alternative and the Upper Guadalupe River Project would temporarily increase water temperature in the Guadalupe River downstream from Almaden Lake (Figure 6.2-4; Section 6.2.4, "Cumulative Impacts on Water Quality"). The increase in water temperature could adversely affect chinook salmon and steelhead, as described for the Guadalupe River Project (Section 5.6.4, "Bypass System Alternative") and the Upper Guadalupe River Project (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 2000a).

In addition to the direct effects of individual projects on water temperature and the associated effects on chinook salmon and steelhead, the Upper Guadalupe River Project

would cause an incremental increase in water temperatures between Grant Street and West Taylor Street (model segments 30 through 35 in Figure 6.2-4; Section 6.2.4.4, "Cumulative Impacts on Water Quality – Temperature"). The cumulative impact of the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative on chinook salmon and steelhead would be less than significant because:

- The incremental change in water temperature would be relatively small, especially from October through May, when most anadromous fish life stages are present (Figures 6.2-4 and 6.2-5; Section 6.2.4.4, "Cumulative Impacts on Water Quality – Temperature"), and water temperatures during the summer months would be within the range that would support rearing of juvenile steelhead.
- The actual increase in water temperature should be less than simulated because shade provided by SRA cover vegetation reestablished in Segment 3 of the Guadalupe River Project with Bypass System Alternative would begin to cool water temperatures prior to construction of interacting elements of the Upper Guadalupe River Project.
- The stream length affected by the incremental change is relatively small and juvenile steelhead could move to locations that provide more suitable temperatures, including upstream reaches, deeper pools, and areas of local cool water inflows.

Water temperature increases caused by the Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative would not interact with water temperature increases potentially caused by the Lower Guadalupe River Project and would not result in an adverse cumulative impact on anadromous fish. The Guadalupe River Project would not affect water temperatures downstream from Highway 101 at the downstream end of model segment 39 (Figure 6.2-4; Section 6.2.4, "Cumulative Impacts on Water Quality"). Also, the actual increase in water temperature between I-880 and Highway 101 (model segments 38 and 39 in Figure 6.2-4) should be less than simulated because shade provided by SRA cover vegetation has been partially reestablished in Segments 1 and 2 of the Guadalupe River Project (Section 5.4.2, "No-Action Alternative"). Postmitigation water temperature impacts of the Guadalupe River Project with Bypass System Alternative and Upper Guadalupe River Project would be less than significant. At maturation, planted SRA cover vegetation in the Upper Guadalupe River Project area is expected to cool water temperatures and, compared to preproject conditions, improve habitat conditions for chinook salmon and steelhead (Figures 6.2-4 and 6.2-5). The cooling of water temperatures would extend into the project area of the Guadalupe River Project with Bypass System Alternative. SRA cover vegetation planted in Segments 1 and 2 of the Guadalupe River Project and in Reach A would cool water temperatures in Reach A to lower than preproject conditions. SRA cover vegetation planted as part of the Guadalupe Creek Restoration Project would also cool water temperatures and improve habitat conditions for steelhead and chinook salmon compared to preproject conditions, although the effects would be limited to Guadalupe Creek. Under postmitigation conditions, the long-term cumulative effect of the Guadalupe River Project with Bypass System Alternative and the other major projects in the Guadalupe River watershed on water temperatures would be to benefit anadromous species in Guadalupe Creek (model segments 5 and 6) and in the Guadalupe River (model segments 19 through 31, 38, and 39) (Figure 6.2-4).

As discussed in Section 6.2.4.5, "Cumulative Impact on Water Quality – Dissolved Oxygen," the cumulative impact of increased water temperatures on dissolved oxygen concentrations

is less than significant because concentrations of dissolved oxygen will remain within the natural range of daily variations in dissolved oxygen. Cumulative impacts of variations in dissolved oxygen concentrations on fish and fish habitat would be less than significant.

The potential impact of the Lower Guadalupe River Project on fish and fish habitat resulting from changes in water temperatures cannot be identified until the final design of the Lower Guadalupe River Project has been determined. However, it is possible that some cumulative impacts may result. Any potential impacts that the Lower Guadalupe River Project may have on fish and fish habitat will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

6.2.7.6 Shaded Riverine Aquatic Cover Impacts

The following analysis of cumulative impacts on fish and fish habitat as a result of cumulative changes to SRA cover focuses on those projects that were identified in Section 6.2.5, "Cumulative Impacts on Biological Resources – Vegetation," as principal contributors to the potential cumulative changes in SRA cover: the Santa Clara Valley Water District Fish Ladder Construction Program, Guadalupe Creek Restoration Project, Upper Guadalupe River Project, Guadalupe River Project with Bypass System Alternative, and Lower Guadalupe River Project.

The channel widening, bank excavation, and channel bed and bank armoring associated with the Guadalupe River Project with Bypass System Alternative and other major projects would remove SRA cover vegetation (Section 6.2.5.2, "Cumulative Impacts on Biological Resources – Vegetation – SRA Cover Vegetation"). The removal of SRA cover, including instream and overhead components, could adversely affect rearing habitat by exposing fish to predators, reducing the availability of resting areas, and reducing the abundance of aquatic food organisms.

The Santa Clara Valley Water District Fish Ladder Construction Program, Guadalupe Creek Restoration Project, Upper Guadalupe River Project, Guadalupe River Project with Bypass System Alternative, and Lower Guadalupe River Project would all include reestablishment and additional planting of SRA cover vegetation in both onsite and offsite locations (Section 6.2.1, "Projects Addressed in the Cumulative Impacts Analyses," and Section 6.2.5.2, "Cumulative Impacts on Biological Resources – Vegetation – SRA Cover Vegetation"). SRA cover vegetation would be planted along Guadalupe Creek below Masson Dam and at multiple locations along the Guadalupe River from downstream from Almaden Lake to Airport Parkway in Reach A. In addition, installation of rock weirs and biotechnical features as part of Guadalupe Creek Restoration Project, Upper Guadalupe River Project, and Guadalupe River Project with Bypass System Alternative wouldprovide instream cover. The planting of SRA cover vegetation and the installation of instream cover features will reestablish cover and rearing areas and reduce cumulative adverse impacts on resident and anadromous fish rearing to less-than-significant levels.

The potential impact of the Lower Guadalupe River Project on fish and fish habitat resulting from changes in SRA cover cannot be identified until the final design of the Lower Guadalupe River Project has been determined. However, it is possible that some cumulative impacts may result. Any potential impacts that the Lower Guadalupe River Project may have on fish and fish habitat will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

6.2.8 Land Use and Planning

As described in Section 5.7, "Land Use and Planning," the Guadalupe River Project with Bypass System Alternative would be consistent with existing land use plans, policies, and regulations. The Guadalupe River Project with Bypass System Alternative would not change existing land uses and is compatible with surrounding land uses. The Guadalupe River Project with Bypass System Alternative therefore would not contribute to other ongoing regional impacts associated with development or other land use conversions.

6.2.9 Recreation, Public Access, and Visual Resources

The Guadalupe River Project with Bypass System Alternative in combination with the other major projects indicated in Section 6.2.1, "Projects Addressed in the Cumulative Impact Analysis," could result in a short-term cumulative impact on recreational opportunities along the Guadalupe River and access to the river corridor. This cumulative impact is considered less than significant because construction of the projects would not occur simultaneously and the projects would not directly affect parks or other formal river access points. The Guadalupe River Project with Bypass System Alternative would not contribute to a cumulative impact on boating because the project features would accommodate existing opportunities for boating.

Construction of the Bypass System Alternative in combination with other projects along the river corridor would affect the visual character of the river corridor by removing riparian vegetation. Only localized viewsheds would be affected. Successful implementation of SRA cover and riparian vegetation mitigation would restore and in some cases enhance the aesthetic character of the river corridor. The Upper Guadalupe River Project and the Guadalupe Creek Restoration Project would result in a substantial increase in SRA cover vegetation compared to existing conditions. Replanting riparian vegetation in areas along the river disturbed during construction of each project, in combination with proposed infill plantings would result in a less-than-significant cumulative impact on visual resources.

The Guadalupe River Project with Bypass System Alternative, the Guadalupe River Park Project, and the Upper Guadalupe River Project would result in additional recreation opportunities along the Guadalupe River. The potential impact of the Lower Guadalupe River Project on recreation cannot be identified until the final design of the Lower Guadalupe River Project has been determined. It is possible, however, that some cumulative impacts may result. Any potential impacts that the Lower Guadalupe River Project may have on recreation will be considered in the design and analyzed in the environmental review of the Lower Guadalupe River Project.

6.2.10 Transportation and Traffic

The direct effects of the Guadalupe River Project with Bypass System Alternative on transportation and traffic are described in Section 5.9, "Transportation and Traffic." Cumulative impacts on traffic in the project area are related to the combination of the Guadalupe River Project with Bypass System Alternative, completion of State Route 87 between New Julian Street and Highway 101, and construction of the Vasona LRT Project. Construction of the bypass system as part of the Bypass System Alternative is scheduled to begin in 2002 and end in 2004. The overlap between the construction periods for the Bypass System Alternative, the State Route 87 project, and the Vasona LRT Project will cause short-term cumulative impacts on traffic. However, these impacts would not be substantial

because project-specific mitigation measures for traffic have been developed and will be implemented for all three projects. Consequently, the short-term cumulative impacts on transportation and traffic during construction are considered less than significant.

The Guadalupe River Project with Bypass System Alternative would not contribute to a long-term cumulative impact on transportation and traffic because roadway capacities through the project site would not change and only occasional trips would be required for maintenance and operation.

6.2.11 Air Quality

Because the major projects occurring along the Guadalupe River would have little operational impacts on air quality, the only major potential cumulative air quality impact is associated with short-term construction impacts. Standard construction-period mitigation measures required by BAAQMD for all projects in the Guadalupe River watershed would prevent significant cumulative emissions of dust and equipment exhaust and would ensure that emissions would not conflict with BAAQMD's 1997 Clean Air Plan and its 1999 Ozone Attainment Plan. No significant cumulative impacts on air quality would result from the combined impacts of the major projects occurring along the Guadalupe River.

6.2.12 Noise

As indicated in Section 5.11, "Noise," the Guadalupe River Project with Bypass System Alternative is not expected to generate additional noise once the flood protection features have been constructed. This project therefore would not contribute to a long-term cumulative impact on noise. Although project-related construction noise would occur, it would not contribute to a cumulative impact on noise when combined with other major projects because no noise-sensitive receptors are located in the area of the Guadalupe River Project with Bypass System Alternative and because all construction would occur during daylight hours.

6.2.13 Hazards and Hazardous Materials

The Guadalupe River Project with Bypass System Alternative would not directly contribute to cumulative long-term impacts involving hazardous materials because the project does not include the long-term use, storage, or disposal of hazardous materials. The hazardous waste mitigation measures identified in Section 5.10, "Hazards and Hazardous Materials," would ensure that construction activities associated with the Guadalupe River Project with Bypass System Alternative would not contribute to impacts from hazardous materials on people or the environment. Mercury contamination of sediments in the Guadalupe River, Guadalupe Creek, and other area streams is a preexisting regional issue that is under the jurisdiction of CAL-EPA, SWRCB, and the San Francisco Bay RWQCB. The issue of cumulative impacts related to mercury is discussed in Section 6.2.4, "Cumulative Impacts on Water Quality."

6.2.14 Cultural Resources

As indicated in Section 5.14, "Cultural Resources," construction of the Guadalupe River Project with Bypass System Alternative is not expected to affect known historic or prehistoric cultural resources. In the event unknown historic or prehistoric cultural resources are disturbed during construction, impacts would be avoided by evaluating and treating the site. Treatment could consist of data recovery or avoidance.

The Guadalupe River Project with Bypass System Alternative would not contribute to the cumulative loss of known historic or prehistoric cultural resources because none would be affected during construction. In addition, the Bypass System Alternative would result in less-than-significant cumulative impacts on unknown cultural resources because sites would be evaluated and protected or information about the site properly recorded if cultural resources are unearthed during construction.

6.3 Cumulative Impacts – Refined Bypass System Alternative (Proposed Action) and Other Guadalupe River Projects

The Refined Bypass System Alternative would include all the flood protection components that would be constructed as part of the Bypass System Alternative except for the armoring of the east bank of the Guadalupe River in the vicinity of the New Julian Street Bridge (Figure 3.5-1). Channel bank armoring under the Refined Bypass System Alternative would total approximately 5,332 lf or 200 lf less than under the Bypass System Alternative. The Refined Bypass System Alternative would directly affect 5.41 acres of riparian vegetation, which is 0.35 acre less than under the Bypass System Alternative. The Refined Bypass System Alternative would directly affect approximately 3,789 lf of SRA cover vegetation, which is approximately 72 lf less than under the Bypass System Alternative. The east bank recreational trail would not pass under the New Julian Street Bridge as it would under the Bypass System Alternative. Instead, the trail would be rerouted through the intersection of New Julian Street and North River Street to ensure continuous public access to the east side of the Guadalupe River. The Refined Bypass System Alternative would include the same environmental commitments identified for the Bypass System Alternative.

The cumulative impacts of the Guadalupe River Project with Refined Bypass System Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts of the Guadalupe River Project with Bypass System Alternative and other projects in the Guadalupe River watershed described in Section 6.2 ("Cumulative Impacts – Bypass System Alternative and Other Guadalupe River Projects"). Table 6.4-1 summarizes the cumulative impacts and environmental commitments for both the Bypass System Alternative and the Refined Bypass System Alternative.

6.4 Cumulative Impacts – No-Action Alternative and Other Guadalupe River Projects

The No-Action Alternative includes flood protection components in Segments 1 and 2 and Segment 3C Phases 1 and 2 of the Guadalupe River. The flood protection components in Segments 1 and 2 were completed in 1994 and 1996, respectively. The flood protection components in Segment 3C Phase 1 were completed in January 2000 and those in Segment 3C Phase 2 are scheduled for completion in early 2002. The No-Action Alternative includes several mitigation components, as described in Chapter 3, "Alternatives, Including the Proposed Action." These include:

- Planting 21.0 acres of riparian vegetation mitigation in Segments 1 and 2

- Planting a minimum of 4,526 lf of SRA cover vegetation in Segments 1 and 2, the Woz Way to Park Avenue bypass reach, Reach A, and along Guadalupe Creek; additional HEP analyses may indicate that additional SRA cover vegetation mitigation is necessary
- Replacing up to 5,090 sf of river-run gravels
- Installing a low-flow channel in Segment 3C to provide fish passage; armored sections of Segments 1 and 2 already have a low-flow channel installed

The construction of Segment 3C Phase 2 and the mitigation components listed above are the only changes from existing conditions that would occur with the No-Action Alternative. The following analysis of the cumulative impacts of the No-Action Alternative and past, present, and reasonably foreseeable actions in the Guadalupe River watershed is based on the premise that the No-Action Alternative would result in little change from existing conditions.

6.4.1 Hydrology and Hydraulics

Under the No-Action Alternative, flood protection for the 100-year design floodflow would not be provided for the downtown San Jose area. In addition, the capacity of the lower Guadalupe River may not need to be increased if the No-Action Alternative is implemented. The hydrologic conditions in Segments 1, 2, and 3 would be similar to those under the existing conditions. No adverse indirect or cumulative impacts are expected because the No-Action Alternative would not change the overall channel capacity in the downtown project area. The beneficial impacts of flood protection would not be provided.

6.4.2 River Geomorphology

Under the No-Action Alternative, no significant impacts on river morphology are expected during construction of Segment 3C Phase 2 because minor changes to the pattern of pools, riffles, and runs due to channel bed armoring will be compensated for by construction of the trapezoid/boulder low-flow channel. Cumulative impacts of the No-Action Alternative and projects in the Guadalupe River watershed would consist of continued bank and bed instability in Segment 3 because no invert stabilization structures would be constructed in that segment. This would be a less-than-significant impact because it would not change the characteristics of channel erosion occurring under existing conditions.

6.4.3 Water Quality

No significant impacts on water quality are expected during construction of Segment 3C Phase 2 because any impacts would be fully mitigated by implementing erosion-control programs during construction. No significant indirect or cumulative impacts on water quality are expected as a result of the incremental impacts of the No-Action Alternative.

6.4.4 Biological Resources – Vegetation

The potential cumulative impacts on vegetation resources of the No-Action Alternative and projects in the Guadalupe River watershed will be similar to those described in Section 6.2.5, "Cumulative Impacts on Biological Resources – Vegetation." No significant indirect or cumulative impacts on riparian vegetation are expected as a result of the incremental impacts of the No-Action Alternative because of the 21.0 acres of riparian vegetation that have already been planted as mitigation for riparian losses. The No-Action Alternative

would affect 4,526 lf of SRA cover vegetation; however, a minimum of 4,526 lf of SRA cover vegetation mitigation will be planted as mitigation. Therefore, no significant indirect or cumulative impacts on SRA cover vegetation are expected as a result of the incremental impacts of the No-Action Alternative. If the No-Action Alternative is selected, an additional HEP analysis will be conducted to determine if additional SRA cover vegetation mitigation is necessary.

6.4.5 Biological Resources – Wildlife

The potential cumulative impacts on wildlife of the No-Action Alternative and projects in the Guadalupe River watershed will be similar to those described in Section 6.2.6, "Cumulative Impacts on Biological Resources – Wildlife." The No-Action Alternative will result in no significant indirect or cumulative impacts on wildlife.

6.4.6 Biological Resources – Fisheries

The cumulative impact on water temperatures of the Upper Guadalupe River Project and the No-Action Alternative would consist of the potential elevation of water temperatures in the downtown project area above the temperatures that would occur if only the No-Action Alternative were selected. This temperature increase would be less than expected for the Bypass System Alternative because less SRA cover vegetation would be removed under the No-Action Alternative. The potential temperature increase would be mitigated by the incremental decrease in temperatures expected once mitigation plantings for the Upper Guadalupe River Project have reached maturity.

Under the No-Action Alternative, the USGS gage at St. John Street and the exposed gas and sewer lines upstream from UPRR Bridge No. 4, which are potential fish passage barriers, will not be removed or relocated. This would be a less-than-significant impact because it would not change the fish passage characteristics occurring under existing conditions.

6.4.7 Other Resources

The cumulative impacts of the No-Action Alternative and projects in the Guadalupe River watershed will be similar to the impacts described for the Guadalupe River Project with Bypass System Alternative in Section 6.2, "Cumulative Impacts – Bypass System Alternative and Other Guadalupe River Projects," for the following resource areas:

- Land use and planning
- Recreation, public access, and visual resources
- Transportation and traffic
- Air quality
- Noise
- Hazards and hazardous materials
- Cultural resources

Long-term beneficial cumulative impacts of the No-Action Alternative and projects in the Guadalupe River watershed would be less than those described for the Guadalupe River

Project with Bypass System Alternative in Section 6.2, "Cumulative Impacts – Bypass System Alternative and Other Guadalupe River Projects." If the No-Action Alternative is selected, bank erosion would not be reduced in the project area, and instream habitat values would not show as much increase.

6.5 Summary of Cumulative Impacts

Table 6.4-1 (provided at the end of this chapter) summarizes the cumulative environmental effects expected to occur under the No-Action Alternative, the Bypass System Alternative, and the Refined Bypass System Alternative (Proposed Action). It includes the impacts analyzed and mitigation described in Section 6.2, "Cumulative Impacts – Bypass System Alternative and Other Guadalupe River Projects;" Section 6.3, "Cumulative Impacts – Refined Bypass System Alternative (Proposed Action) and Other Guadalupe River Projects;" and Section 6.4, "Cumulative Impacts – No-Action Alternative and Other Guadalupe River Projects."

6.6 Other Required Analyses

6.6.1 Relationship between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Short-term uses of the environment that would occur as a result of construction of the Refined Bypass System Alternative and that would narrow the range of beneficial uses of the environment include impacts on existing riparian vegetation and SRA cover vegetation as well as impacts from other construction-related activities. In the long term, planting to recreate these habitat types will offset the loss of riparian vegetation and SRA cover vegetation and enhance the long-term productivity of the Guadalupe River watershed. Other short-term environmental impacts associated with construction activities, such as reduced air quality and increased noise and traffic, would occur only during the construction phase of the Guadalupe River Project with Refined Bypass System Alternative and would not affect the long-term productivity of the environment.

6.6.2 Irreversible or Irretrievable Commitments of Resources

The Guadalupe River Project with Refined Bypass System Alternative would result in the irretrievable commitment of fossil fuels, other energy resources needed to construct channel modifications and the bypass system, and construction materials. The construction of the channel modifications is not considered an irreversible or irretrievable commitment of resources because the Guadalupe River Project with Refined Bypass System Alternative will enhance the ability of an existing stream channel to pass floodflows. The bypass system would be a permanent fixture and would be an irreversible change in land use. The bypass system will be covered and thus will not be incompatible with either urban or open-space uses of the surrounding area. Proposed recreation facilities would also result in an irreversible change in land use along the Guadalupe River. The proposed recreation facilities are in accordance with the Guadalupe River Park Master Plan and are therefore an anticipated change in land use.

6.6.3 Growth-Inducing Impacts

The areas of the City of San Jose adjacent to the Guadalupe River are almost completely developed, and there is little remaining vacant land. Urban growth in the downtown project area is not currently restricted by the potential for flooding. Implementation of the Guadalupe River Project with Refined Bypass System Alternative is not expected to remove a significant restraint to growth.

6.6.4 Identification of the Environmentally Preferred and Environmentally Superior Alternative

The Corps and SCVWD have identified the Refined Bypass System Alternative as the environmentally preferred and the environmentally superior alternative, pursuant to the requirements of NEPA and CEQA, respectively. The environmentally preferred and environmentally superior alternative is the alternative that causes the least damage to the biological and physical environment and protects, preserves, and enhances historic, cultural, and natural resources while accomplishing the project's objectives.

The Refined Bypass System Alternative would result in a slight decrease in bank armoring and a decrease in impacts on riparian vegetation and SRA cover vegetation compared to the Bypass System Alternative. The Refined Bypass System Alternative would also meet flood protection goals while maintaining water temperatures, provide habitat for endangered fish species, and provide recreational opportunities.

Although the No-Action Alternative would result in fewer direct environmental impacts, it would not meet the objectives to provide 100-year flood protection to downtown San Jose, maintain or improve water temperatures, provide and restore habitat for endangered fish species, and provide recreational opportunities.

The selection of the Refined Bypass System Alternative as the environmentally preferred and environmentally superior alternative is based on the conclusions of the impact analyses presented in Chapter 5 and Chapter 6 of this Report.

TABLE 6.4-1. Comparison of Cumulative Environmental Impacts

Cumulative impacts include incremental impacts from each project alternative added to the individual impacts of other major projects in the Guadalupe River watershed. Projects included in the cumulative impact analysis are described in Section 6.2.1 and listed at the end of this table.

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
6.2.2 HYDROLOGIC AND HYDRAULIC IMPACTS		
Flood Protection	Would convey the 100-year design floodflow. (B)	No change from existing conditions. Floodwaters would not be contained in the river channel during the 100-year design floodflow.
Hydrologic and Hydraulic Impacts	Under the 2-year design floodflow, mean channel velocities would decrease. Under high flow conditions (flows equal to or greater than the 10-year design floodflow), velocities would decrease in bypassed segments of the river channel compared to existing conditions but increase in armored sections. Velocities during high flows would be greater than under existing conditions because floodflows would remain in the river. Changes in flow velocity could change the suitability of the affected channel reaches for aquatic species. Cumulative impacts on aquatic species are discussed in Section 6.2.7. Flow velocities in the bypasses would exceed the flow velocity in the river channel when flows are equal to or greater than the 10-year design floodflow. Differences in flow velocity in the bypasses and the natural channel may change the suitability of the affected channel reaches for aquatic species. Cumulative impacts on aquatic species are discussed in Section 6.2.7. The total volume of flow discharged to the South Bay during any flood would not change appreciably with completion of the major projects in the Guadalupe River watershed. The total volume of floodflows might reach the South Bay hours or a day earlier than under existing conditions, which would not be a substantial change. (LS)	The hydrologic conditions in Segments 1, 2, and 3 would be similar to existing conditions. No indirect or cumulative adverse impacts are expected because the No-Action Alternative would not change the existing channel capacity in the downtown project area.

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
Construction – Channel Erosion and Deposition	Erosion and increased sedimentation in the Guadalupe River during construction would be avoided by implementing the SWPPP and erosion and sediment control plan. (LS)	Erosion and increased sedimentation in the Guadalupe River during construction would be avoided by implementing the SWPPP and erosion and sediment control plan. (LS)
Construction – River Morphology	Cumulative flood protection project features would not alter the sediment load, would be designed to maintain sediment transport continuity, and would be limited in length compared to the river as a whole. (LS) Changes in channel form may change the suitability of the affected channel reaches for aquatic species. Cumulative impacts on aquatic species are discussed in Section 6.2.7.	Cumulative flood protection project features would not alter the sediment load and would be designed to maintain sediment transport continuity. (LS)
Operation – Channel Erosion and Deposition	The transport of wash load (fine sediments) through the river to San Francisco Bay would not be affected because velocities necessary for transport would be maintained. Bedload sediment would continue to settle out between Trimble Road and Montague Expressway in the lower Guadalupe River. In summary, sediment transport would not be affected by the operation of projects in the Guadalupe River watershed. (LS) Channel erosion and deposition may change in localized areas in response to the specific magnitude and duration of a flood. Constructed channel features, such as invert stabilization structures, rock weirs, or biotechnical bank stabilizers, would avoid or minimize areas of channel erosion throughout the natural channel of the Guadalupe River. Modeling would continue to be conducted during the design phase of the Guadalupe River Project with Bypass System Alternative to assist in the selection and design of channel features to protect the channel from erosion. (LS)	The sediment transport capacity and sediment load carried in river flows downstream from Segment 3C would not change, and the existing channel erosion processes would continue. (LS)
Operation – River Morphology	The frequency and duration of channel maintenance flows in the river channel would not be affected because the bypasses would not become operational until flows reach 1,500 cfs. Therefore, there would be little or no change in the pattern of riffles, runs, and pools and in the transport of the river's sediment load over the long term. (LS) Low-flow channels would be constructed in armored sections of the river channel to assist in sediment transport and to provide fish passage. (LS)	Bank and bed stability in Segments 1, 2, and 3 would continue to decrease. However, this would be a less-than-significant impact because it would not change the existing river morphology in the project area of the No-Action Alternative. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
6.2.4 Water Quality Impacts		
Construction – Suspended Solids and Biostimulatory Nutrients	The incremental contributions of suspended solids from construction activities in the Guadalupe River watershed are anticipated to be less than significant because soil-disturbing activities would be conducted in compliance with approved SWPPPs, erosion and sediment control plans, and mitigation and monitoring plans. (LS)	No significant impacts are expected during construction of Segment 3C Phase 2 because impacts would be fully mitigated by implementing erosion control programs. No indirect or cumulative impacts on water quality are expected as a result of the incremental impacts of the No-Action Alternative. (LS)
Operation – Suspended Solids and Biostimulatory Nutrients	Operation and maintenance of the flood protection projects on the Guadalupe River would not cause long-term changes in the transport of wash load sediments in the channel. Maintenance activities may cause temporary and intermittent disturbances of channel and bank sediments. Maintenance activities would be infrequent and would incorporate erosion and sediment control measures. Long-term operation and maintenance of flood protection projects on the Guadalupe River would not adversely affect beneficial uses of the river or result in the degradation of water quality. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
Construction – Toxic Constituents	Any temporary impairment of water quality resulting from spills of construction materials would be avoided through the implementation of SWPPPs and erosion and sediment control plans. Cumulative impacts would be less than significant because toxic materials control and spill-response plans would be implemented for major construction projects occurring in the watershed to avoid or control potential accidents. (LS) The potential for increased mercury deposition into the river would be eliminated or minimized through the routine sampling of excavated material and the proper disposal or reuse of this material. The Corps and SCVWD would implement the project's Soil Management Plan to minimize discharges of mercury-laden sediments during construction activities and ensure the proper disposal and reuse of mercury-laden soil. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
Operation – Toxic Constituents	To minimize operational affects, SCVWD would participate with the San Francisco Bay RWQCB in assessing mercury transport in the Guadalupe River and the potential for methylation associated with proposed wetland and riparian mitigation. SCVWD's participation would include monitoring of flow, total suspended solids, total and bioavailable mercury, and methyl mercury concentrations in river-bottom and suspended sediments of the Guadalupe River for 1 year. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
Water Temperature	The Upper Guadalupe River Project and the Guadalupe River Project with Bypass System Alternative would result in a combined postproject temperature increase of 6.5 °F in the upstream portion of Segment 3B. Downstream from Coleman Avenue and through Reach A, combined postproject water temperatures would be no different than for the Guadalupe River Project with Bypass System Alternative alone. Under postmitigation conditions, shade provided by plantings of SRA cover vegetation would reduce water temperatures below preproject levels in Reach A, upstream from I-280, and in Guadalupe Creek, which would be a beneficial effect. Water temperatures in Segments 1, 2 and 3 would be slightly elevated compared to preproject conditions. The cumulative changes in postproject water temperatures are considered less than significant because postmitigation water temperatures would be reduced to preproject levels or below for most of the Guadalupe River watershed. (LS) Changes in water temperature may change the suitability of the affected channel reaches for aquatic species. Cumulative impacts on aquatic species are discussed in Section 6.2.7.	No significant indirect or cumulative impacts on water temperature are expected as a result of the incremental impacts of the No-Action Alternative. (LS)
Dissolved Oxygen	Projects in the Guadalupe River watershed would result in a maximum decrease in dissolved oxygen concentrations of approximately 0.6 mg/L. This impact is considered less than significant because the decrease is within the natural range of daily variations in dissolved oxygen. (LS)	No change from existing conditions. (NE)
6.2.5 BIOLOGICAL RESOURCES – VEGETATION		
Riparian Vegetation	The Upper and Lower Guadalupe River Projects in combination with the Guadalupe River Project with Bypass System Alternative could affect up to 27 acres of riparian habitat. Because of the mitigation for riparian losses, no significant indirect or cumulative impacts are expected. (LS) The Upper and Lower Guadalupe River Projects in combination with Refined Bypass System Alternative could affect slightly less than 27 acres of riparian habitat. Because of the mitigation for riparian losses, no significant indirect or cumulative impacts are expected. (LS)	Loss of 8.36 acres of riparian vegetation would be fully compensated for by the 21.0 acres of mitigation plantings and ongoing monitoring. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
Shaded Riverine Aquatic (SRA) Cover Vegetation	Projects in the Guadalupe River watershed would result in the loss of approximately 14,100 lf of SRA cover vegetation. This loss would be fully mitigated by the establishment of SRA cover vegetation that replaces the function and value of habitat lost. (LS)	A total of 4,705 lf of SRA cover vegetation would be planted as compensation for the loss of 4,526 lf from the No-Action Alternative. Additionally, a HEP analysis would be conducted to determine the need for any additional plantings. The No-Action Alternative would therefore not contribute to potential cumulative impacts. (LS)
Wetlands	The Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative would have no effect on wetlands and would therefore not contribute to potential cumulative impacts. The wetland impacts of other projects in the Guadalupe River watershed would be fully mitigated. (LS)	No wetlands would be affected by the No-Action Alternative. The No-Action Alternative would therefore not contribute to potential cumulative impacts. (NE)
Alviso Slough – Salt Marsh and Wetlands	The combined Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative and Upper Guadalupe River Project would not result in changes to inundation of slough benches. No significant cumulative impacts on marsh habitat in Alviso Slough would occur. (NE) Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of slough benches may or may not change after construction of the Lower Guadalupe River Project. The EIR/EIS for the Lower Guadalupe River Project would analyze the cumulative effects of the Lower Guadalupe River Project in combination with other major projects in the watershed.	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)
Salt Evaporation Ponds	The combined Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative and Upper Guadalupe River Project would not result in changes to flooding of salt evaporation ponds. No significant cumulative impacts on salt evaporation ponds would occur. (NE) Depending on the flood protection elements constructed for the Lower Guadalupe River Project, the depth, frequency, and duration of inundation of salt evaporation ponds may or may not change after construction of the Lower Guadalupe River Project. The EIR/EIS for the Lower Guadalupe River Project would analyze the cumulative effects of the Lower Guadalupe River Project in combination with other major projects in the watershed.	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
6.2.6 BIOLOGICAL RESOURCES – WILDLIFE		
Disturbance from Humans	The cumulative increase in wildlife disturbance resulting from human activities is less than significant because wildlife along the entire length of the Guadalupe River are already subjected to substantial disturbance from recreational use and urban activities adjacent to the project areas. Urban and recreational disturbances would increase even in the absence of the major flood protection projects. In addition, the recreational trails and vegetation protection plan would help to concentrate the recreational use in specific corridors that are outside wildlife habitat areas. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
Disturbance of California Red-Legged Frog	Projects in the Guadalupe River watershed would not affect the red-legged frog or habitat critical to its continued existence because the red-legged frog does not occur in areas affected by the projects. (NE)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)
Disturbance of Western Snowy Plover	No significant cumulative impacts on the western snowy plover would occur as a result of the Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative and the Upper Guadalupe River Project. (NE) Corps and SCVWD for the Guadalupe River Project with Bypass System Alternative would ensure that floodwaters are pumped out of salt evaporation pond A8D between the months of January and May. (B) Corps and SCVWD for the Guadalupe River Project with Bypass System Alternative would monitor floodflows and surface-water levels in Alviso Slough and in evaporation pond A8D. The monitoring program would be coordinated with USFWS.	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
Disturbance of California Clapper Rail	No significant cumulative impacts on the California clapper rail would occur as a result of the Guadalupe River Project with Bypass System Alternative or with Refined Bypass Alternative and the Upper Guadalupe River Project. (NE) Corps and SCVWD would monitor clapper rail habitat in the Alviso Slough area to determine whether the habitat in the salt marsh changes after construction of the Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative. Monitoring would focus on dominant plant species and habitat types in Alviso Slough and floodflows, surface-water levels, and salinity in Alviso Slough. The monitoring program would be coordinated with USFWS.	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)
Disturbance of Salt Marsh Harvest Mouse	No significant cumulative impacts on the salt marsh harvest mouse would occur as a result of the Guadalupe River Project with Bypass System Alternative, Refined Bypass System Alternative, and Upper Guadalupe River Project. (NE) Corps and SCVWD would monitor salt marsh harvest mouse habitat in the Alviso Slough area to determine whether the habitat in the salt marsh changes as a result of construction of the Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative. Monitoring would focus on dominant plant species and habitat types in Alviso Slough and floodflows, surface-water levels, and salinity in Alviso Slough. The monitoring program would be coordinated with USFWS.	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)
6.2.7 BIOLOGICAL RESOURCES – FISH		
Hydrologic and Hydraulic Effects	Projects in the Guadalupe River watershed would not affect the timing, magnitude, frequency, and duration of low- to medium-range flows; depth and velocity conditions needed to support fish migration, spawning, and rearing would therefore not be substantially affected. Velocities in the bypasses would not result in adverse effects on migrating anadromous fish. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
Channel Erosion and Deposition	Projects in the Guadalupe River watershed include channel features that will protect the channel from erosion, including invert stabilization structures, rock weirs, and biotechnical bank stabilizers. Channel-maintenance flows and gravel-flushing flows will remain in the natural channel to maintain channel form and gravel quality. Therefore, the depth of riffles, flow velocity in riffle areas, spawning gravel occurrence, and the distribution and structure of pools, riffles, runs, and backwaters in the Guadalupe River watershed are not expected to be substantially affected by erosion and deposition. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
Geomorphology	Projects in the Guadalupe River watershed include grading, channel widening, and channel armoring activities that would affect fish habitat, including gravels and the distribution and structure of pools, riffles, runs, and backwaters. Low-flow channel structures in areas of river-bottom armoring, invert stabilization structures in the natural channel, spawning gravel replacement, SRA cover vegetation replacement, and other environmental commitments would reestablish fish habitat values. Cumulative adverse impacts on anadromous fish migration, spawning gravel, and rearing habitat in the Guadalupe River watershed would be avoided, minimized, and mitigated. (LS) Cumulative impacts are potentially beneficial to anadromous species because the Upper Guadalupe River Project would provide access to an additional 10.9 miles of spawning and rearing habitat on Alamitos and Guadalupe Creeks. (B)	Cumulative impacts of the No-Action Alternative and projects in the Guadalupe River watershed would be characterized by continued decreases in bank and bed stability in Segments 1, 2, and 3. This would be a less-than-significant impact because it would not change the existing river morphology in the project area of the No-Action Alternative. (LS)
Suspended Solids and Toxic Constituents	Cumulative impacts of suspended solids and toxic constituents on fish species in the Guadalupe River would be avoided though implementation of project-specific SWPPPs, erosion and sediment control plans, and toxic materials control and spill-response plans. Projects in the Guadalupe River watershed would also not affect the source or input of mercury into the system. The flood protection projects and the Guadalupe Creek Restoration Project would discourage the development of instream conditions such as wetlands or other anoxic, high sulfate, low pH, and high organic matter aquatic environments that would be conducive to enhanced methylation. Cumulative adverse effects on fish species and aquatic organisms would be less than significant.	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
Water Temperature	Removal of SRA cover vegetation during construction of projects in the Guadalupe River watershed would temporarily increase water temperatures in the Guadalupe River downstream from Almaden Lake. The cumulative impact would be less than significant because the incremental change in water temperatures would be relatively small, especially from October through May, when most anadromous fish life stages are present; water temperatures during the summer months would be within the range that would support rearing of juvenile steelhead; and the stream length affected by the incremental change is relatively small. (LS) Under postmitigation conditions, the long-term cumulative reduction in water temperatures as a result of planted SRA cover vegetation associated with projects in the Guadalupe River watershed would benefit anadromous species in Guadalupe Creek and in the Guadalupe River. This incremental decrease in water temperatures would improve conditions for chinook salmon and steelhead, especially from June through October. (B) The cumulative impact of temporary increases in water temperatures on dissolved oxygen concentrations is less than significant because levels of dissolved oxygen would remain within the natural range of daily variations in dissolved oxygen. (LS)	The cumulative impact on water temperatures of the Upper Guadalupe River Project and the No-Action Alternative would consist of the potential elevation of water temperatures in the downtown project area above the temperatures that would occur if only the No-Action Alternative were selected. This temperature increase would be less than expected for the Bypass System Alternative because less SRA cover vegetation would be removed under the No-Action Alternative. The potential temperature increase would be mitigated by the incremental decrease in temperatures expected once mitigation plantings for the Upper Guadalupe River Project have reached maturity. (LS)
SRA Cover	The planting of SRA cover vegetation and the installation of instream cover features would reestablish cover and rearing areas and reduce cumulative adverse impacts on resident and anadromous fish rearing to less-than-significant levels. (LS) SRA cover establishment in Guadalupe Creek would increase the amount of rearing and spawning habitat for anadromous fish in the upper tributaries of the Guadalupe River watershed. (B)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
6.2.8 LAND USE AND PLANNING		
Land Use	The Guadalupe River Project with Bypass System Alternative would not change existing land uses and is compatible with surrounding land uses. Therefore, the Guadalupe River Project with Bypass System Alternative would not contribute to ongoing regional impacts associated with development or other land use conversions. (NE)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (NE)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
6.2.9 RECREATION, PUBLIC ACCESS, AND VISUAL RESOURCES		
Recreation	The Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative and other projects in the Guadalupe watershed could affect recreational opportunities along the river corridor during construction. This cumulative impact is considered less than significant because construction of the projects would not occur simultaneously and the projects would not directly affect parks or other formal river access points. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
Public Safety	Public safety would be protected by appropriate safety measures during construction and operation, including limiting public access to the channel. (LS)	Public safety would be protected by appropriate safety measures during construction and operation, including limiting public access to the channel. (LS)
Boating	The flood protection projects in the Guadalupe River watershed are not expected to substantially change water-dependent recreation opportunities in the river. (LS)	The flood protection projects in the Guadalupe River watershed are not expected to substantially change water-dependent recreation opportunities in the river. (LS)
Visual Resources	Projects in the Guadalupe River watershed would affect the visual character of the river corridor by removing riparian vegetation and constructing flood protection facilities. Successful implementation of revegetation onsite and offsite would restore and in some cases enhance the aesthetic character of the riparian corridor. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
6.2.10 TRANSPORTATION AND TRAFFIC		
Roadway Capacity	The overlap between the construction periods for the Guadalupe River Project with Bypass System Alternative or with Refined Bank System Alternative and State Route 87 in 2001 would cause short-term cumulative impacts on traffic. However, these impacts would not be substantial because project-specific traffic mitigation measures have been developed for the Guadalupe River Project with Bypass System Alternative and with Refined Bypass System Alternative and because only a small number of truck trips would occur during peak hours. (LS) No long-term cumulative impacts on traffic are expected because the Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative would generate a minimal number of vehicle trips. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
6.2.11 AIR QUALITY		
Construction	Standard construction-period mitigation measures required by BAAQMD for all projects in the Guadalupe River watershed would prevent significant cumulative emissions of dust and equipment exhaust and would ensure that emissions would not conflict with BAAQMD's 1997 Clean Air Plan and its 1999 Ozone Attainment Plan. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)
Operation	The Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative would not have any operational impacts on air quality. No indirect or cumulative impacts would occur as a result of the incremental effects of the Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative. (NE)	No change from existing conditions. (NE)
6.2.12 NOISE		
Construction	The Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative and other projects in the Guadalupe watershed would result in less-than-significant cumulative impacts on noise because of the lack of noise-sensitive receptors in the area and because all construction would occur during daylight hours. (LS)	Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the cumulative impacts identified for the Guadalupe River Project with Bypass System Alternative. (LS)

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TABLE 6.4-1. (Continued)

Resource and Issues	Impact and Environmental Commitment: Bypass System Alternative and Other Projects[a]/ Refined Bypass System Alternative and Other Projects	Impact and Environmental Commitment: No-Action and Other Projects
6.2.13 HAZARDS AND HAZARDOUS MATERIALS		
	The Guadalupe River Project with Bypass System Alternative and with Refined Bypass System Alternative would not contribute to cumulative long-term impacts involving hazardous materials because the projects do not include the long-term use, storage, or disposal of significant quantities of hazardous materials. (NE) Construction activities associated with the Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative would not contribute to impacts on people or the environment from hazardous materials because of the implementation of mitigation measures identified in Section 5.10, "Hazards and Hazardous Materials." (LS)	No hazardous material sites were identified in Segment 3C Phase 2. Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the Guadalupe River Project with Bypass System Alternative. (LS)
6.2.14 CULTURAL RESOURCES		
	The Guadalupe River Project with Bypass System Alternative or with Refined Bypass System Alternative would not contribute to the cumulative loss of known historic or prehistoric cultural resources in the Guadalupe River watershed because no known sites would be affected by construction. In addition, the Bypass System Alternative would result in a less-than-significant cumulative impact on unknown cultural resources because sites unearthed during construction would be tested and protected or information about the site's properly recorded. (LS)	No cultural resource sites were identified in Segment 3C Phase 2. Cumulative impacts of the No-Action Alternative and other projects in the Guadalupe River watershed would be similar to the Guadalupe River Project with Bypass System Alternative. (LS)

[a] Eighteen major projects in the Guadalupe River watershed are analyzed in the cumulative impact analysis (Section 6.2.1): Guadalupe River Park Project, State Route 87 Freeway Upgrade Project, State Route 85 Transportation Corridor Project, San Jose International Airport Expansion Plan, Santa Clara Valley Water District Fish Ladder Construction Program, Guadalupe Creek Restoration Project, Upper Guadalupe River Flood Control Project, Lower Guadalupe River Flood Protection Project, Stormwater Pump Installations, Virginia Street Bank Stabilization Project, Santa Clara Valley Water District Stream Maintenance Program, Alviso Ring Levee Mitigation and Restoration Project, Almaden Quicksilver County Park Project, Boston Property Project, John P. McEnery Park Site Improvements, Los Gatos Creek Trial Project, Vasona Light Rail Extension Project, and Core Location Project.

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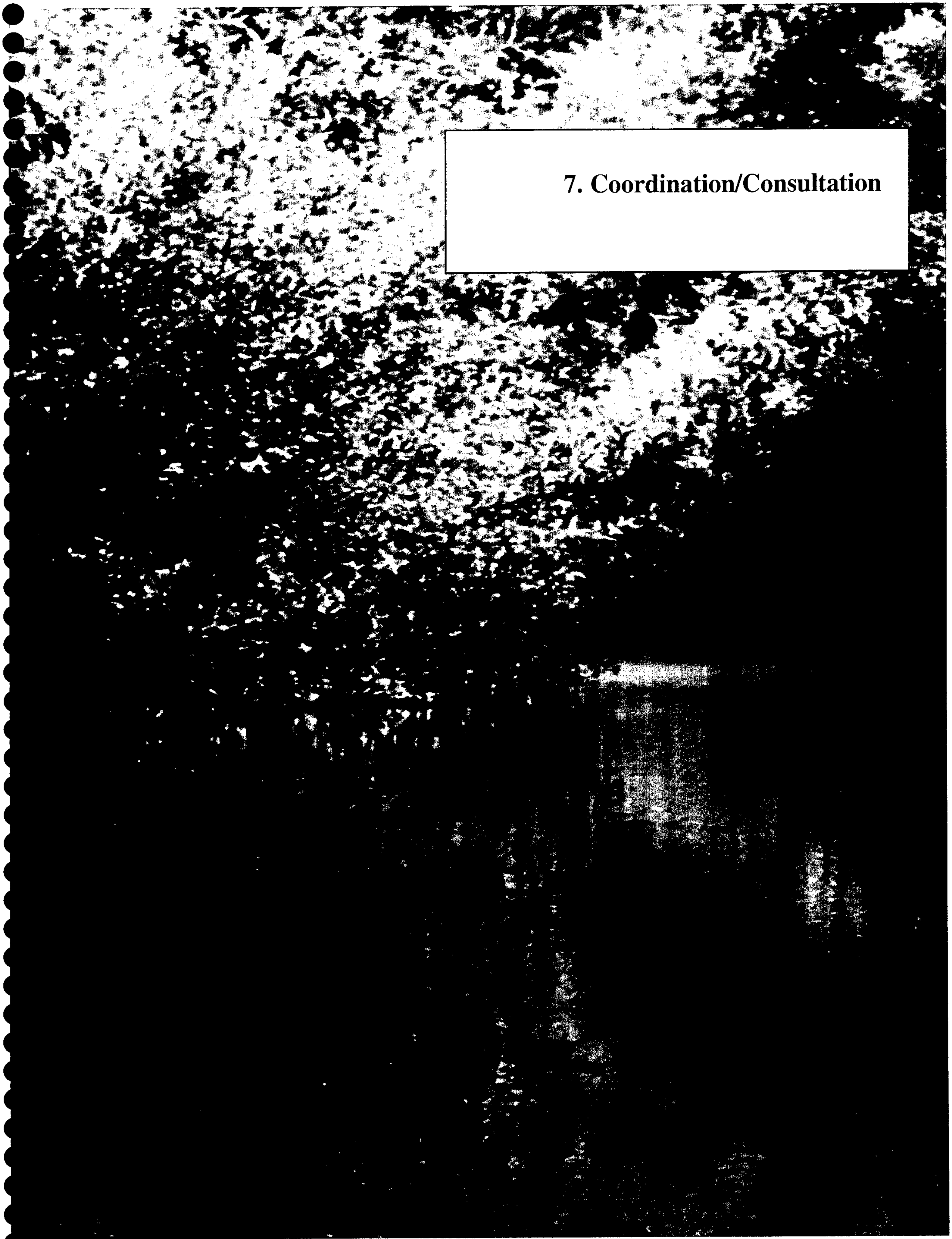
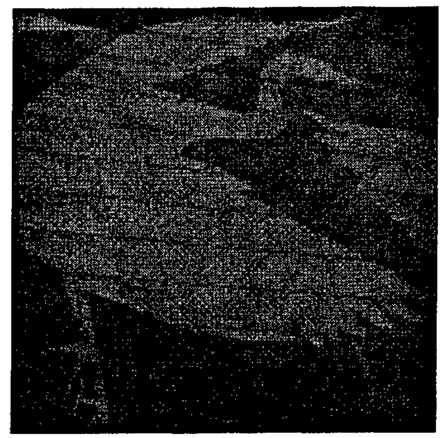
7. Coordination/Consultation



CHAPTER 7
Coordination and Consultation

7.1 Public Involvement

The public and concerned planning and resource agencies have been invited to participate in all phases of the Guadalupe River Project since its Feasibility Study phase in the early 1980s. This has included opportunities to comment on the 1985 Guadalupe River Interim Feasibility Report and EIS, as well as on the 1990 and 1991 EAs. After the Corps and SCVWD committed to modify the project in 1998, additional efforts were made to solicit public input and feedback on Guadalupe River planning efforts, including:



- Disseminating information through SCVWD web site
- Providing background information through newspaper articles covering the project in the San Jose Mercury News (9/1/99, 7/28/98) and the San Francisco Chronicle (9/1/99, 9/28/98, 8/26/98)
- Creating opportunities for comment and discussion through public meetings and workshops at which the Corps, SCVWD, and other involved agencies have actively participated

Two public meetings regarding the scope of this Report were held on November 9 and 17, 1999, to provide background information and status of recent project modification planning, and to solicit input and feedback about potential alternative project refinements. Concerns identified during public scoping typically fell into three categories: environmental, recreational, and flood protection.

Environmental issues include public concerns about the biological effects of the project, including effects on vegetation, wildlife, and fish. Specific information was requested during the scoping process on the extent of the project's effect on these resources and measures to prevent impacts. Because fish are dependent on a limited range of water temperatures, concerns about the project's effects on river temperature were also raised. In addition, there was concern about the hydrological and geomorphological effects of the project, such as sediment transport and potential inundation of areas behind proposed flood training walls.

Concerns about the project's effects on recreation were also raised during scoping. Most of the comments received indicated concern about the provision of adequate trails along the river, although several comments indicated concern about enhancing access to the river and potential negative impacts on wildlife. Additional concerns included (1) effects on

endangered species as a result of improved fishing access, (2) public safety once proposed modifications to the Authorized Project are operational, and (3) effects of any instream structures on recreational boating.

Public concerns about flood protection included various issues, such as the length of time required to complete the project and noise impacts on adjacent landowners during construction. Additional areas of concern included the project's effect on the visual character of the river corridor, visual impact from the park in the Confluence East development, and the effects of ongoing maintenance on biological resources.

All pertinent scoping concerns have been duly considered in the preparation of this Report. Comments on report scoping are on file at the Corps office as part of the project record. Concerned public will also have the opportunity to comment on this Report during the 45-day comment period for the Public Draft and then during the 30-day review period after release of the Final GRR/EIR/SEIS.

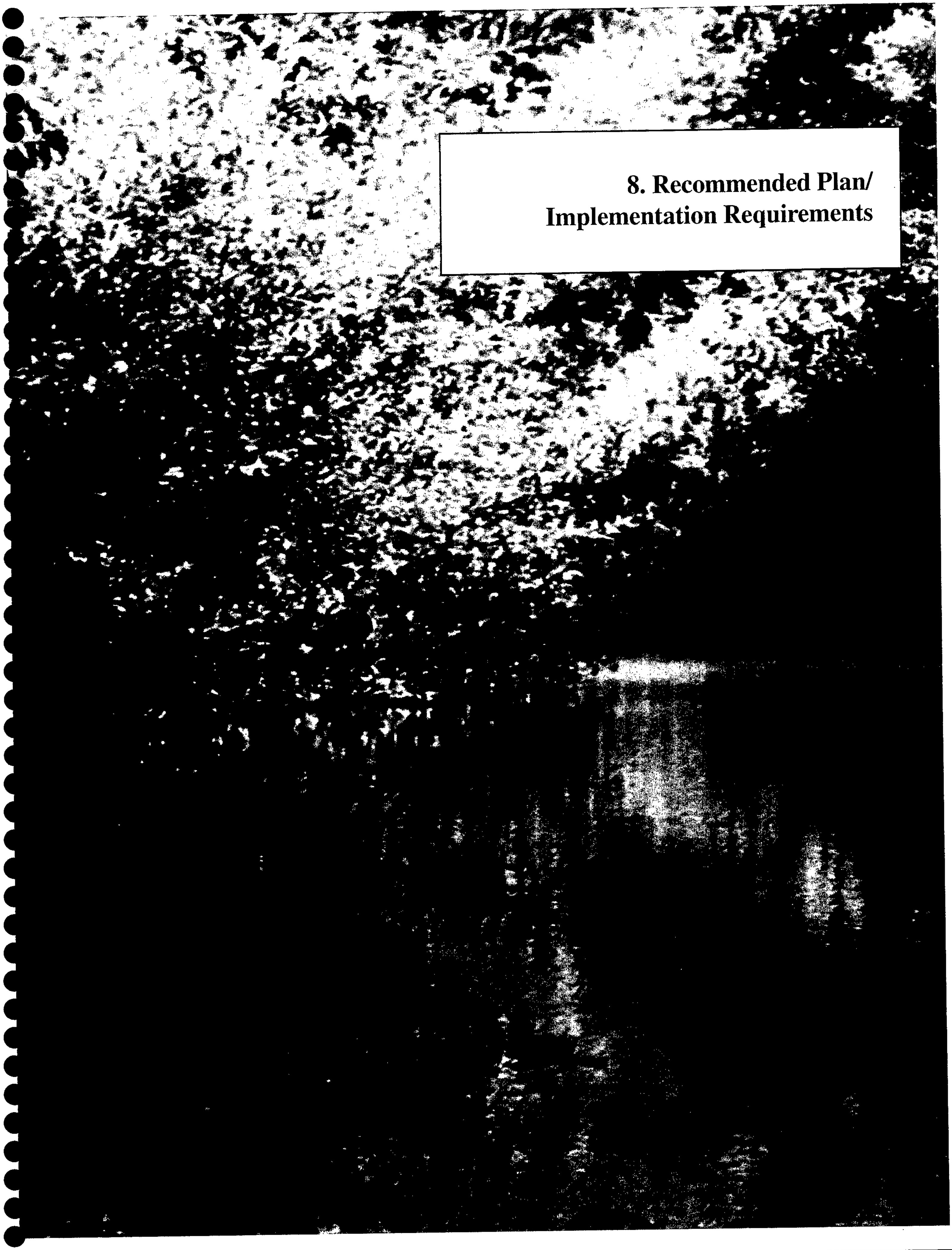
7.2 Federal, State, and Local Agency Involvement

Throughout the history of the Authorized Project, the Corps and SCVWD have coordinated planning activities with other Federal, State, and local regulatory and planning agencies. In the 1980s, coordination with these agencies led to development of the Authorized Project. This coordination continued into the 1990s, leading to implementation of the Authorized Project and development of the Authorized Project with Additional Mitigation. When project construction was halted in 1996, feedback from the various planning and regulatory agencies was key to working through a revised approach, as well as development and refinement of a range of alternatives for public consideration that would meet the flood protection, recreational, and environmental objectives of the project. The primary conduit for technical feedback from other agencies and environmental groups since 1997 has been the Guadalupe River Flood Protection Project Collaborative, with members representing the following organizations:

- U.S. Army Corps of Engineers
- Santa Clara Valley Water District
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- California Water Resources Control Board
- California Department of Fish and Game
- San Francisco Bay Regional Water Quality Control Board
- City of San Jose
- City of San Jose Redevelopment Agency
- Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited (represented by the Natural Heritage Institute)

Collaborative members cooperatively developed the DRM and the MMP, participated in planning, and set criteria for formulation, evaluation, and screening of alternative plans to modify the Authorized Project.

8. Recommended Plan/ Implementation Requirements



CHAPTER 8

Recommended Plan and Implementation Requirements

8.1 Introduction

This chapter provides information in support of decisions to be made by the Corps and SCVWD, and other decision-makers as part of the GRR approval process. It summarizes revised benefits, costs, and other implementation requirements associated with the proposed modifications to the Authorized Project, as required by Corps' administrative guidelines. These modifications primarily reflect requirements to comply with the ESA and the CWA that were unanticipated in 1986, when the Authorized Project was approved. In this chapter, several terms are used that are required by Corps guidelines. These terms are identified and explained as they occur. For example, the Recommended Plan may also be referred to as the Modified Project in this chapter or as the Guadalupe River Project with Proposed Action in Chapters 3, 4, 5, and 6. These terms are considered synonymous herein.

8.2 Selection Rationale

The project modification objectives shown below, including general objectives, design objectives, and construction objectives, were used to compare alternative plans for project modification, resulting in the Recommended Plan/ Proposed Action. Features of the Recommended Plan/ Proposed Action are listed in Table 8.2-1 and are illustrated in Figures 8.2-1 and 8.2-2 (located on foldout page at the end of the Chapter for easy reference).

8.2.1 Project Modification Objectives

8.2.1.1 General Objectives

- Reduce flood damage from the Guadalupe River in downtown San Jose by conveying flows up to 17,000 cfs through the project area consistent with the Authorized Project.
- Avoid the use of concrete and other types of armoring to the greatest extent possible.
- Avoid potential adverse effects to fish and wildlife habitat, with special emphasis on the avoidance of Shaded Riverine Aquatic (SRA) cover used by chinook salmon and steelhead trout in the project area.
- Provide mitigation for unavoidable adverse effects to fish and wildlife by replacing both the quantity and quality of affected habitat.

TABLE 8.2-1 Features of the Guadalupe River Project with Refined Bypass System Alternative

Feature	Amount/Length
Provides Flood Protection up to the 100-Year Design Floodflow	Yes
Material Excavated	
River Channel	30,000+ cy
Bypass System	341,900+ cy
Subtotal	371,900+ cy
Bridges Removed	3 street and 2 railroad bridges
Bank Armoring	
Segment 1	
West Bank	448 lf
East Bank	448 lf
Segment 2	
West Bank	305 lf
East Bank	305 lf
Segment 3A	
West Bank	695 lf
East Bank	695 lf
Segment 3B	
West Bank	1,861 lf
East Bank	2,081 lf
Segment 3C	
West Bank	1,250 lf
East Bank	1,085 lf
Subtotal	9,173 lf
Riverbed Armoring	
Segment 1	448 lf
Segment 2	305 lf
Segment 3A	695 lf
Segment 3B	1,861 lf
Segment 3C	
Phase 1	0 lf
Phase 2	1,045 lf
Phase 3	0 lf
Subtotal	**4,354 lf**
Invert Stabilization Structures	9 to 15 structures
Bypass	
A	5,000 lf
B	4,000 lf
C	2,500 lf
Trails [a]	**16,000 ft**
Resource	**Proposed Action**
Riparian Vegetation	
– effect (loss)	13.77 acres
– mitigation	21 acres
Shaded Riverine Aquatic Cover Vegetation	
– effect (loss)	8,315 lf
– mitigation	22,836 lf [b]
Fish Spawning Habitat	
– effect (loss of spawning gravel)	up to 24,850 sf
– mitigation (replace spawning gravel)	up to 25,190 sf

[a] Trail lengths are approximate and rounded to nearest 1,000 feet.
[b] Total mitigation for the entire Guadalupe River Project is based on a HEP analysis and equals 18,026 lf.
Source: U.S. Army Corps of Engineers, 1991b

- Avoid potential adverse effects to river morphology, and fish spawning and rearing habitat by maintaining adequate flows in the main river channel.
- Be consistent with City of San Jose's redevelopment plans and plans for preservation of historic and cultural resources adjacent to the Guadalupe River through integration with the 1995 Guadalupe River Park Master Plan.
- Be consistent with recreation elements in local recreation plans, the Corps 1991 GDM (as revised in 1993) for the Authorized Project, and the City of San Jose's 1995 Guadalupe River Park Master Plan.
- Reduce ongoing incision of the natural channel bed to preserve the existing SRA cover, spawning gravel, and other fish and wildlife habitat.
- Assure that the project will not cause elevated water temperature or harm to anadromous fish species during project construction, immediately after construction, or over the entire project life.
- Provide successful migration of anadromous fish through the downtown San Jose section of the Guadalupe River between I-880 and I-280.

8.2.1.2 Design Objectives

- Convey 17,000 cfs through the project area.
- Design recreation trails and other recreation elements that are compatible with local recreation plans and the 1991 GDM (as revised in 1993).
- Avoid removal of SRA cover to the maximum extent possible.
- Maintain channel maintenance and gravel-flushing flows in the bypassed sections of the river channel by diverting water into the bypass system only after flows in the river exceed 1,500 cfs.
- Determine locations of ongoing degradation of the riverbed, and design invert stabilization structures to halt scouring
- Design features that allow fish passage. Relocate existing utility crossings and other physical barriers to fish passage.
- Balance velocities in the natural channel through the project area to prevent scouring, streambank erosion, or excessive sediment deposition.

8.2.1.3 Construction Objectives

- Use special construction provisions when constructing the proposed bypass adjacent to existing bridge foundations and buildings.
- Protect SRA cover, riparian habitat adjacent to the work area, and avoid fish and wildlife to the maximum extent feasible.
- Give special construction consideration to the excavation and disposal of soil to avoid transporting heavy metals back to the Guadalupe River watershed.
- Comply with Section 1600 of the California Fish and Game Code, and a Stormwater Pollution Prevention Plan, to avoid adverse effects to water quality.

8.2.1.4 Compliance with NED Objective

The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment,

pursuant to national environmental statutes, applicable Executive orders, and other Federal planning regulations. Contributions to national economic development (NED) are increases in the net value of the national output of goods and services expressed in monetary units. The alternative plan with the greatest net economic benefits consistent with protecting the Nation's environment is identified as the NED plan. The Refined Bypass System Alternative is therefore recognized as the NED Plan for Corps and Federal decision-makers. It is also recognized as the "environmentally preferred plan" for purposes of CEQA compliance and as the "least environmentally damaging plan" pursuant to NEPA and the CWA. The rationale for selection of the Recommended Plan is discussed in Section 8.3.

8.2.2 Identification of Current Problems and Opportunities

The primary public and agency concerns along the Guadalupe River are the threat of significant flooding, the need for protection and mitigation of fish and wildlife habitat for threatened and endangered species, and opportunities for recreation and public access along the Guadalupe River in downtown San Jose.

Approximately 1 mile of the 2.6 miles of the Guadalupe River Project has been constructed. During the construction of Segments 1 and 2, concerns were raised about the adequacy of the environmental mitigation measures for the entire project. To address these concerns, detailed hydrologic, hydraulic, economic, and environmental studies for the proposed project modifications have been completed. The results of these studies, as summarized in this Report, verify the public and agency concerns related to the need for flood protection, riparian habitat protection, and endangered species protection. Opportunities were developed to reduce flooding and the threat of flood damage, protect fish and wildlife habitats for threatened and endangered species, and enhance recreation in downtown San Jose.

8.2.3 Constraints

As part of the evaluation of technical and environmental factors of preliminary alternatives, key objectives were developed for use in evaluating the feasible alternatives. The key objectives include flood protection, recreation, and environmental mitigation criteria. Constraints on the Modified Project associated with the key objectives are listed below.

8.2.3.1 Flood Protection

Level of Protection. The Modified Project will provide 100-year level of protection consistent with the Authorized Project and pending Upper and Lower Guadalupe River Flood Protection Projects.

Design Discharges and Hydrology. The peak discharge of the Guadalupe River is 14,600 cfs upstream from the confluence with Los Gatos Creek and 17,000 cfs downstream from the confluence. The 1977 hydrologic analysis used for the Authorized Project has been reviewed and determined to remain valid (Appendix 4C).

Channel Maintenance Flow. Channel maintenance flow is defined as the flow that just fills a nonincised channel to flood stage. This flow determines the channel morphology and is responsible for transporting the largest part of the sediment load over time. Channel maintenance flow will be retained in the Guadalupe River channel prior to any diversion of

floodflows into the proposed bypass system. In 1987 the Corps, SCVWD, and NMFS agreed to maintain a minimum of 1,500 cfs in the natural channel prior to diversion in the bypass system.

Hydraulic Design Criteria. Hydraulic design criteria such as freeboard, permissible velocities, and channel roughness will be in accordance with the 1991 GDM (as revised in 1993). The GDM hydraulic design criteria have been subsequently reviewed and determined to remain valid.

Project Operation. The Modified Project will not be made operational until SCVWD's Lower Guadalupe River Flood Protection Project is completed. The Lower Guadalupe River Flood Protection Project will be completed concurrently with the Modified Project.

8.2.3.2 Recreation

Consistency with General Design Memorandum and Recreation Master Plan. The approved project recreation plan was presented in the project's 1991 General Design Memorandum and provides basic facilities for public access, public health, and safety. This NED recreation plan will be cost-shared 50-50 with the project partner, SCVWD. The project partner will also assume all responsibility for operation and maintenance of the recreation facilities. Any additional facilities, i.e. betterments beyond basic facilities, desired by local interests will be provided entirely at their own cost

The recreation component of the Modified Project will also be consistent with the current Local Cooperation Agreement (LCA) for Recreation and other regional and local recreation master plans within the project area. This includes the 1995 Guadalupe River Park Master Plan; the Regional Parks, Trails, and Scenic Highways Plan for Santa Clara County; and the City of San Jose Horizon 2000 General Plan. The Modified Project will complement the LCA, recreation master plan, and recreation use in the project area by providing additional recreation trail access, river views, and wildlife viewing opportunities. Recreation components are described in Section 8.4.

Recreation Lands. Recreation elements will be constructed on project lands required for flood protection improvements and facilities.

8.2.3.3 Offsite Environmental Mitigation

The Authorized Project right-of-way does not provide sufficient area for all compensatory mitigation required to fully offset the potential adverse effects of the Modified Project. Therefore, additional lands are required offsite of the Authorized Project right-of-way to provide all required compensatory mitigation.

Consideration of Baseline and Likely Future Environmental Conditions. Corps' guidance requires that potential project effects be addressed based on the projected difference between existing and likely future conditions in the project area, both with and without the Modified Project. These conditions were used to evaluate modifications made to the Authorized Project.

The resource agencies determined that the Corps and SCVWD should use 1992 conditions for determining losses of riparian habitat, SRA cover, and spawning gravel, and to develop acceptable mitigation for project effects on SRA, riparian and spawning gravel. The 1992

environmental conditions are conditions along the Guadalupe River, before construction of Authorized Project segments 1, 2, and 3C Phases 1 and 2.

Evaluation of potential project effects on hydraulic and hydrologic conditions, erosion and deposition, river morphology, water quality, temperature, wildlife species, special status species, fish migration, fish rearing, recreation, visual resources, boating, traffic, air quality, noise, public services, and cultural resources was based on 1999 conditions.

Determination of Project Effects. The Proposed Action is the construction of a bypass in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, and additional offsite mitigation. The incremental effect of the Proposed Action on several environmental resources cannot be adequately determined in isolation from the effects contributed by the previously completed phases of the Authorized Project. For this reason, the effects of the Proposed Action on hydraulic and hydrologic conditions, erosion and deposition, river morphology, water temperature, dissolved oxygen, wildlife species, fish migration, fish spawning and fish rearing were evaluated for the entire Guadalupe River Project with Proposed Action. Likewise, mitigation for effects of the Proposed Action on these resources is identical to the mitigation for the entire Guadalupe River Project with Proposed Action.

1992 Conditional Water Quality Certification. In 1992 the SWRCB attached conditions to their CWA Section 401 Water Quality Certification for the Authorized Project, and clarified these conditions in a 1993 letters to the Corps (Appendix 1F). These conditions included the development of a new Mitigation and Monitoring Plan that summarizes all impacts on riparian resources, includes a compensatory riparian mitigation plan, a vegetation protection plan, an erosion control plan, and a fishery mitigation plan (Section 1.5.1.4 "Clean Water Act"). The MMP is included as Appendix 3 of this Report. This MMP supersedes the 1992 MMP (U.S. Army Corps of Engineers, 1992).

Simulated Water Temperatures. Adequate information on preproject water temperatures is not available for the Guadalupe River system. In addition, actual postproject water temperature measurements would not be able to differentiate project effects on water temperature from temperature changes due to annual differences in meteorological conditions. Therefore a water temperature model was used to simulate preproject conditions and postproject effects on water temperature (Section 5.3 and Appendix 1B).

Spawning Gravel Assumptions. The 1992 MMP states that a total of 29,000 sf of gravel would be impacted by the Authorized Project. Actual effects of Segments 1 and 2 on spawning gravels are not known. Project effects are expected to be approximately 19,760 sf as a result of the Modified Project, with proposed mitigation of up to 25,190 sf.

Riparian/SRA Cover Assumptions. The riparian habitat that has been or will be removed for construction or operation of the project will be replaced in amount, quality, and value by establishing 21 acres of riparian habitat.

The SRA cover that will be removed for construction or operation of the Modified Project will be replaced in amount, quality, and value by establishing 22,892 lf of SRA cover in a combination of the project reach, the Woz Way to Park Avenue Bypass Reach, Reach A, and Guadalupe Creek.

Fish Barrier Removal and Fish Access to Guadalupe Creek. Artificial barriers to fish movement in the project reach are being addressed through modifications to the USGS weir located near St. John Street Bridge and the relocation of an exposed sewer line that crosses the river under the Old Julian Street Bridge. The Alamitos drop structure was recently modified to provide for fish passage to the mouth of Guadalupe Creek. It is expected that fish access to Guadalupe Creek, a proposed project mitigation site, will be greater because artificial barriers are removed.

HTRW Assumptions. Effects associated with the presence of hazardous materials in the project area were evaluated in previous environmental documents. However, construction of the proposed project modifications may discover unknown sites. A contingency plan has been developed outlining a course of action in the event that unforeseen HTRW sites are uncovered during construction. The presence of hazardous materials will be monitored during construction. In addition historic mining activities have released mercury-contaminated sediments into the watershed and Guadalupe River (Section 6.2. Therefore, excavated soil will be tested for mercury and will not be reused onsite if mercury levels are higher than 0.1-mg/kg total mercury. In addition, the MMP includes monitoring of flow, total suspended solids, total and available mercury and methyl mercury concentrations in riverbed and suspended sediments.

Cultural and Historical Resources. Effects on cultural and historical resources were evaluated in previous environmental documents. Construction of the Modified Project will be in compliance with Section 106 of the National Historic Preservation Act, as discussed in Chapters 1, 4, 5, and 6 of this Report. The presence of subsurface cultural resources will be monitored during construction.

8.2.3.4 Construction Coordination with Transportation Entities

Construction of the recommended bypass system will need to be coordinated with Caltrans because of conflicts with existing Caltrans rights-of-way and proximity of the bypass to existing structures. The completed bypass system will pass under one railroad spur line, requiring coordination with and approval from UPRR.

8.2.3.5 Economic Preproject Condition

The economic preproject condition is defined as the portion of the Authorized Project that has been constructed prior to the modifications recommended in this report. The preproject condition includes construction of Segments 1, 2, and 3C Phase 1 and 2. The economic preproject condition is also known as the No-Action Alternative or "without-project condition" for economic analysis.

8.3 Selection of Recommended Plan

The Authorized Plan, as refined and described in the 1991 GDM (as revised in 1993), was recognized as the NED plan. The LPP, recommended in the 1991 GDM, was implemented for construction. After construction was halted at the completion of Segments 1 and 2, it was determined that the Authorized Plan, even with additional mitigation was no longer environmentally acceptable. Subsequently, several alternative modifications to the Authorized Project were evaluated. As addressed previously in this Report, the Bypass

System and Refined Bypass System Alternatives are identified as the only alternatives that can economically provide 100-year flood protection and the required environmental mitigation (Chapter 2 and Table 5.15-1).

8.3.1 Consideration of an Array of Alternative Plans

The process for the development and evaluation of alternatives to the Authorized Project was conducted in accord with standard Federal procedures for planning water resources projects, regulations, and laws, and the requirements of NEPA and CEQA. As described in Chapter 2, a wide array of alternative project modifications was considered that would better meet the Authorized Project's objectives for flood protection, recreation, and environmental compliance while avoiding and mitigating adverse effects to the maximum extent practicable. These alternatives were developed and evaluated specifically to meet the objectives described in Section 1.2.4 and in consideration of the concerns of the resource agencies and other interested persons raised during the public scoping process.

8.3.2 Comparison of Potential Environmental Effects of the Alternative Plans

Chapters 5 and 6 describe the potential effects of the alternative plans. Table 5.15-1 summarizes these potential effects. Review of this information reveals that the Bypass System and Refined Bypass Alternatives both are superior to the No Action in terms of avoiding, mitigating, and compensating for potential significant adverse effects.

8.3.3 Consistency with SWRCB Conditions for 401 Certification Requirements

In 1992 the SWRCB attached conditions to their CWA Section 401 Water Quality Certification for the Authorized Project, and clarified these conditions in a 1993 letters to the Corps (Appendix 1F). These conditions included the development of a new Mitigation and Monitoring Plan which (1) adequately summarizes impacts on SRA cover/riparian resources, and specifies mitigation measures and (2) incorporates fishery mitigation measures. The fishery mitigation measures are required to fully mitigate any project-related thermal impacts, and to include a detailed vegetation planting and plant maintenance plan to reestablish vegetation cover. In addition, the SWRCB indicated that the RWQCB, CDFG, USFWS, and NMFS must approve the MMP. In a letter dated September 10, 1998, the SWRCB indicated that it would reconsider certification after the final design and environmental documents were prepared for the Modified Project. The Bypass Alternative and the Refined Bypass Alternative are the only proposed alternatives which include a new MMP that meets all conditions stipulated by the SWRCB. The conditions of certification under Section 401 of the CWA are reiterated below, along with the location of each element in the new MMP (Appendix 3 of this Report).

8.3.3.1 Summary of Impacts on Wetland, Riparian, and Fish Habitat

A summary of impacts on wetland, riparian, and fish habitat expected to result from implementation of the Modified Project is presented in MMP Chapters 2 and 4 and MMP Appendices C and D. The summary includes narrative and maps that synthesize and update the information presented in previous environmental documents. For each reach of the river in which construction would take place, existing wetland, riparian, and fish habitats are described and the amount of habitat that might be removed by construction is indicated.

8.3.3.2 Compensatory Riparian Mitigation Plan

Detailed descriptions of and plans for compensatory mitigation sites are provided in MMP Chapters 2 and 4 and MMP Appendices C and D. The plans include approximate locations, quantities, and species of mitigation plantings. Criteria used to evaluate whether mitigation has been successful in offsetting the loss of wetland and riparian functions and values are discussed under the measurable objectives summarized in Table 4-1 of the MMP. Chapter 4 of the MMP also includes a discussion of the monitoring procedures summarized in Table 4-2; provisions for reporting to concerned agencies are described in Section 4.9, "Reporting." Remedial actions will be implemented should monitoring indicate that the mitigation has not been fully successful, based on the measurable objectives. Chapter 2 of the MMP also describes the source and availability of irrigation water for mitigation plantings and provides information on how mitigation sites will be protected from urban effects.

8.3.3.3 Vegetation Protection Plan

The vegetation protection plan will be part of the best management practices required in the Modified Project construction plans and specifications. The selected construction contractor(s) will be responsible for implementing these plans under Corps oversight. General information for a vegetation protection plan is included as Appendix F of the MMP. SRA cover vegetation is shown in MMP Appendix 1G, including both vegetation that would be adversely affected and vegetation that would be avoided by project construction.

8.3.3.4 Erosion Control Plan

Erosion and sediment delivery to the Guadalupe River will be minimized during Modified Project construction; related efforts will include measures to minimize the potential for sediment to enter the river and interim soil stabilization measures pending establishment of vegetative cover. As part of the Storm Water Pollution Prevention Plan (SWPPP) required for project construction, the erosion and sediment control plan will be prepared and incorporated into project construction plans and specifications. The selected contractor(s) will be responsible for implementing the erosion and sediment control plan under Corps oversight, as required by the permitting process of the National Pollutant Discharge Elimination System (NPDES).

8.3.3.5 Fishery Mitigation Plan

The design of the Modified Project includes a low-flow channel in all armored riverbed sections. The low-flow channel provides for fish passage and fish resting areas. Chapter 4 of the MMP also includes measures for the mitigation of adverse thermal effects related to the project, as well as replacement of overhead SRA cover and instream SRA cover. Table 4-1 of the MMP includes measurable objectives designed to assure the maintenance in perpetuity of fish passage, fish-rearing habitat, and spawning gravels. The Modified Project also provides for operational standards for the secondary channel in Segment 2 and compensation for the effects of removing the U.S. Geological Survey (USGS) gaging weir upstream from St. John Street Bridge.

Mitigation measures for the No-Action Alternative are described in the 1992 MMP. The 1992 MMP does not contain the above elements, and therefore, will not fulfill the requirements set by the SWRCB for water quality certification under Section 404 of the CWA. The 1992

MMP and subsequent revisions were found not to be acceptable by the SWRCB. Therefore, the No-Action Alternative does not meet conditions for water quality certification.

8.3.4 Consistency with Dispute Resolution Objectives

Early in the planning stages, objectives were identified by the Collaborative in the Dispute Resolution Memorandum to be used to monitor the development of various social and environmental elements of the recommended project modifications. Implementation of the Authorized Project with the proposed modifications is expected to achieve the following benefits, which are consistent with the initial measurable objectives.

8.3.4.1 Public Access

The Modified Project provides for recreational uses on the banks of the Guadalupe River by developing open spaces and a trail system for people to use and enjoy the river that runs through a vital urban area. The Modified Project will make the river accessible to a broader range of people.

8.3.4.2 Flood Protection

Currently, the Guadalupe River poses the threat of causing millions of dollars in flood damage to thousands of homes and businesses in downtown San Jose. The objective of the Modified Project is to control periodic flooding, provide 100-year flood protection, and to minimize associated negative impacts and costs.

8.3.4.3 Aesthetic Beauty

Currently, access to the Guadalupe River is limited. The Modified Project's provisions for additional plantings and more open space will enhance the river's natural beauty and that of the surrounding area. The natural beauty of the river should not be diminished by construction of the Modified project (Section 5.8).

8.3.4.4 Education

The Modified Project will not only make the waterway more accessible to the public, but will also provide more open space for the public to enjoy. This park setting is a perfect place in which to educate the public about water resources, the river, and its natural habitat. These educational opportunities will provide elements that increase the public's appreciation of nature and emphasize the importance of preserving natural habitats.

8.3.4.5 Recreation

With the population of the Santa Clara Valley increasing, the importance of providing places for public recreation has been recognized. The Guadalupe River system provides the opportunity for many forms of recreation. These recreational opportunities include walking, jogging, and bicycling along the river's edge, as well as organized events such as concerts, ethnic celebrations, and events that support the river and its many uses. The Modified Project will increase recreational opportunities by increasing public access to the river, as well as providing open space, picnic facilities, trail connections, viewing locations, and opportunities for public education.

8.3.4.6 Wildlife Viewing

The river system provides many opportunities for viewing wildlife in its habitat. Wildlife forms are diverse and include many types of birds, turtles, fish, mammals, and insects. Many people currently enjoy viewing wildlife along the river system. The Modified Project will increase opportunities for wildlife viewing by making the river trail accessible to people of all physical capabilities.

8.3.4.7 Erosion Protection

Historical development practices resulted in the construction of homes and businesses immediately adjacent to the river. Erosion of the banks and bottom of the river can cause damage to these homes and businesses, as well as generate excessive sediment that can smother downstream habitat and reduce the capacity of the river to carry floodflows. Appropriate erosion protection techniques are included in the project design to protect property and reduce sediment generation, thereby improving downstream water quality and protecting habitat.

8.3.4.8 Groundwater Recharge

The river system has historically provided replenishment of the groundwater basin. With the urbanization of Santa Clara Valley and the associated demand for high quality water, the river's role in replenishing groundwater has become increasingly important. The Modified Project and its mitigation plan will not adversely affect groundwater management and the role it plays in controlling ground surface subsidence.

8.3.4.9 Water Quality

The Modified Project recognizes that water quality is important to the ecological balance in the river system as well as the San Francisco Bay. It is vital that water quality be maintained to ensure a robust ecology. The quality of water being discharged in the San Francisco Bay will not be adversely affected by the project.

8.3.4.10 Subsidence

Subsidence of the valley floor had been a problem through the mid-1960s, due to more water being withdrawn from the groundwater basin than was replenished. This overdrafting of water caused 10 to 13 feet of subsidence, which resulted in drainage and flooding impacts. The Modified Project and its mitigation plan will not adversely affect management of subsidence.

8.3.4.11 Land Use

Land use in the Santa Clara Valley has impacted the river system by allowing development adjacent to the riverbanks. This development has severely restricted the natural flow area available for the river. Intense development of the watershed has also altered the natural pattern of rainfall-runoff and floodflows. The altered flow pattern tends to increase the floodflow and the timing of peak flows in the system. The implementation and enforcement of land use regulation is necessary to protect river system water quality from pollution due to runoff from streets and over the riverbanks.

8.3.4.12 Nonpoint Source Pollution

A major source of contaminants to the Bay comes from nonpoint sources. Nonpoint source pollutants come from a wide variety of sources, rather than a point source such as a publicly owned treatment plant. Over time, best management practices have been adopted in an attempt to control pollutants coming from nonpoint sources. The river system and its long-term health are dependent on controlling these pollutants.

8.3.4.13 Salinity Management

Salinity of the South Bay has decreased over time as the result of discharges from publicly owned wastewater treatment works. Over the past few years, brackish marsh has converted to salt marsh in portions of Coyote Creek. There has also been conversion from salt to brackish marsh in some lower tidal reaches. Infusion of additional fresh water into the river during the growing season could reinforce this already-established trend of reduction in the amount of salt marsh in Alviso Slough. The Modified Project will not adversely effect salinity management in the South Bay.

8.3.4.14 Fish and Wildlife Habitat

The Modified Project will be designed to accommodate the needs of fish and wildlife habitats alike, as the stream and associated riparian habitat supports both year-round residents and migratory species, in accordance with Federal, State, and local level regulations and policy.

8.3.4.15 Vegetation

To enhance water quality, vegetation in and along the river system must remain healthy to filter nutrients and other pollutants. Healthy vegetation also provides protection from erosion and aids sediment management by minimizing losses to riverbanks and the resulting downstream sediment deposits they create.

8.3.4.16 Public Park

The Guadalupe River exists today as a verdant green ribbon through downtown San Jose. Development of the Guadalupe River Park will significantly enhance the urban environment of downtown San Jose and fulfill a need for open space and recreational areas. The park will border the western edge of the downtown area and serve as a greenbelt of open space in the most intensely developed portion of the city. A pedestrian link will be crated which will connect many of the major activity nodes in the area, including the McEnery Convention Center and the San Jose Arena. Public transit, including a Light Rail Transit Station adjacent to the park, will also serve to ensure sufficient public access to the park. A combination of gardens, plazas, trail systems, refurbished major streetscapes, revegetation, and riparian habitat will enhance and improve the surroundings.

8.3.5 Consideration of Open vs. Covered Bypass Channel Designs

As described in Chapter 2, alternative bypass channel designs were evaluated for the proposed bypass system to carry excess floodflows between Santa Clara Street and Coleman Avenue including, open trapezoidal channel, open u-shaped channel, and covered box culvert. Due to significantly higher real estate costs, the trapezoidal channel was eliminated from consideration. An open u-shaped bypass channel was found to be the least-cost open

channel alternative. A covered bypass system was evaluated because of Corps, SCVWD, and City of San Jose safety concerns and was found to be less costly than the open channel alternative.

The open bypass channel would require top of bank access along the channel for maintenance and emergency vehicles. This access road would not be required for the covered bypass. In addition, the open channel would have to be constructed outside of the City of San Jose's Riparian Corridor setback requirements. As indicated in Table 2.2-1, the access road, setback requirements, and other considerations for the open bypass channel represent additional costs of approximately $12 million over the cost of the covered bypass channel. Benefits and mitigation are essentially the same for either the open bypass channel or the covered bypass. Therefore, the covered bypass channel is the least costly bypass and most efficient alternative, maximizes net benefits. It is a feature of both the Bypass System and Refined Bypass System Alternatives, and thus is recognized as part of the NED Plan and/or the Recommended Plan. Engineering considerations relative to the proposed covered bypass system as required in ER 1165-2-118 are found in Appendix 4K.

The covered bypass system is also recommended because the bypass will be located within the Guadalupe River Park that attracts thousands of children and adults for recreation activities each day. The estimated total annual use of the Park is nearly 900,000 persons (Appendix 7). The Guadalupe River Park, in the project reach, includes playgrounds, the Children's Discovery Museum, Confluence Point Park, and a carousel. Also, the bypass reach runs through the heart of downtown San Jose and is surrounded by highly urbanized land uses, including many office buildings and the San Jose Arena. An open channel bypass system would pose an unacceptable public safety risk; therefore, the Recommended Plan includes a covered bypass system.

8.3.6 Comparison of Alternatives' Potential Attainment of Planning Objectives

The following table (Table 8.3-1) presents a comparison of the likely future attainment of project objectives among the alternatives considered in detail. It also displays comparisons of alternative potential future effects on the environment considered in this report, and their attainment of evaluation criteria.

8.3.7 Final Determination of Recommended Plan

Based on the plan selection rationale discussed previously and on public comments received on the Draft Report, the following determinations have been made.

- The Refined Bypass System Alternative has been identified as the NED Plan, the Least Environmentally Damaging Practicable Alternative (LEDPA) under Section 404(b)(1) of the Clean Water Act, the environmentally preferred alternative under NEPA for Corps decision makers, and as the environmentally superior alternative under CEQA for SCVWD decision makers.

- The Refined Bypass System Alternative is also recognized as the Recommended Plan/ Proposed Action and the Locally Preferred Plan (LPP) for Corps and SCVWD decision-makers, subject to further modification at the discretion of the Chief of Engineers, if agreed to by project partners.

TABLE 8.3-1. Comparison of Relative Future Effects of Alternative Plans [a]

Item	No-Action	Bypass System	Refined Bypass System
ATTAINMENT OF OBJECTIVES FOR PROJECT MODIFICATION			
Reduce flood damage	–	+	+
Avoid potential adverse effects	–	+	+
Provide mitigation for unavoidable effects	–	+	+
Consistent with redevelopment plans	–	+	+
Provide compatible recreation elements	–	+	+
Reduce erosion potential	–	+	+
Protect and replace SRA cover	–	+	+
Provide fish passage	–	+	+
Convey 17,000 cfs through reach	–	+	+
Avoid adverse effects to water quality	–	+	+
AFFECTED ENVIRONMENT			
Hydrologic and Hydraulic Conditions	–	+	+
River Geomorphology	–	+	+
Water Quality	–	+	+
Biological Resources			
Vegetation	–	+	+
Wildlife	–	+	+
Fish	–	+	+
Land Use and Planning	–	+	+
Recreation, Public Access, Visual/Aesthetic Resources	–	++	+
Transportation and Traffic	–	+	+
Air Quality	+	0	0
Noise	+	0	0
Public Services and Utilities	–	+	+

TABLE 8.3-1. (continued)

Item	No-Action	Bypass System	Refined Bypass System
Hazards and Hazardous Materials	–	+	+
Cultural Resources	0	+	+
EVALUATION CRITERIA			
Completeness	–	+	+
Effectiveness	–	+	+
Efficiency	–	+	++
Acceptability	–	++	++

[a] Ratings are: – = negative effect, doesn't achieve objectives; 0 = no effect or not applicable; + = positive effect, achieves objectives

- The Corps and SCVWD recommend that the NED/LPP (Refined Bypass System Alternative) be selected for implementation rather than the Bypass System Alternative because it fully meets the objectives established by the Collaborative during the Dispute Resolution process and the spirit of CEQA and NEPA to select the least environmentally adverse plan.
- The Refined Bypass System Alternative was developed late in the plan formulation and evaluation process pursuant to CEQA requirements to consider an environmentally superior plan. It includes all of the flood protection, recreation, and mitigation features that would be constructed for the Bypass System Alternative except for 200 linear feet of armoring (gabions) along the east bank of Guadalupe River in the vicinity of the New Julian Street Bridge. This armoring would protect the bank and related recreation trail intended to pass under the bridge. It is this relatively slight difference that distinguishes the two plans. For the Refined Bypass System plan, the east bank recreation trail would cross New Julian Street at grade rather than pass under the bridge and impacts on riparian vegetation and SRA cover would be reduced by 0.35 acre and 72 linear feet, respectively. The associated cost-savings ($0.5 million) are the basis for the NED determination and the reduced east bank armoring is the basis for the environmentally preferred/superior plan and LEDPA determinations.

The Recommended Plan is a multipurpose plan that is based on a thorough analysis and evaluation of alternative solutions for achieving stated flood protection and recreation objectives while meeting environmental mitigation requirements. It is compatible with the major elements and general principles of the locally developed and sponsored Guadalupe River Park plan. Both the flood protection and recreational elements are complete projects that will generate economic benefits upon completion of construction.

8.4 Elements of Recommended Plan

The Modified Project is comprised of the proposed bypass system in Segments 3A and 3B, the construction of flood training walls in Segment 3C Phase 3, expanded onsite mitigation, additional offsite mitigation areas, and upgrading of the Mitigation and Monitoring Plan (Appendix 3).

8.4.1 Flood Damage Reduction

8.4.1.1 Bypass System

The bypass system will route floodflows from the natural river channel into underground conduits for discharge farther downstream where there is adequate channel capacity. The underground bypass system will have multiple conduits with different inlet and outlet locations that will be determined during pending detailed modeling and design analyses (Chapter 3). One or two inlet structures will be located on the Guadalupe River downstream from the Santa Clara Street Bridge, and another inlet structure will be located downstream from the confluence with Los Gatos Creek. The bypass system will have two or three outlets that enter the Guadalupe River in the vicinity of the Coleman Avenue Bridge. The bypass system will consist of about 5,000 feet of covered concrete channel to divert excess floodflows around the bypass reach.

8.4.1.2 Streambank and Invert Protection

The Modified Project contains approximately 5,532 lf of bank armoring and 2,635 lf of invert armoring (Table 3.6-1). Beginning 300 feet downstream from the Santa Clara Street Bridge and extending upstream to the Park Avenue Bridge, cellular concrete mattress (CCM) will be installed across the natural invert and up the right and left banks. Farther downstream, at the St. John Street Bridge and inlet structure, a protective CCM apron will wrap around the entrance of the structure on the right bank, covering approximately 180 lf. Riverbank and channel bed armoring will begin upstream from the Coleman Avenue Bridge and will be extended downstream through the bridge for more than 700 lf of invert and bank protection. The left bank will have gabions to armor the toe of the slope and stone terraces will protect the riverwalk/maintenance road and invert access ramp. The sections of the river invert proposed for armoring with CCM will contain a low-flow channel for fish passage. At the Santa Clara Street and Park Avenue bridges, stairs or ramps would be integrated into the stone terraces to provide access under the bridges.

8.4.1.3 Low-Flow Channel

The 2,635 lf of the channel bed that is proposed for invert armoring with CCM would contain a low-flow channel for fish passage. A low-flow channel check structure design would be constructed using concrete sills, boulders, and gravel. This design will maintain a minimum average water depth of 1.2 feet when the flow is 0-1 cfs. The low-flow channel with check structures has been designed to provide pools at low flows, thereby maintaining cooler water temperatures and improving anadromous fish habitat.

8.4.1.4 Invert Stabilization Structures

Between 9 and 15 invert stabilization structures (Figure 3.4-5) would be placed in the channel bed in unarmored sections of Segments 3A and 3B between Santa Clara Street and

Coleman Avenue. Invert stabilization structures are small weirs that would be placed in the natural river channel in Segments 3A and 3B to reduce the grade of the river, trap coarse sediment, and create in-channel bars and instream fish habitat. The structures would have 3.5 to 4-foot wide low-flow slots to allow the passage of small watercraft. The sides of low-flow slots would slope gradually up to the top of the structure. This slope would help to concentrate the lower flows into a deeper, narrower channel, and encourage the development of 1 to 3-foot deep plunge pools below the low flow slots. The concentration of low flows into the natural low flow channel and the creation of plunge pools would benefit anadromous fish passage and provide instream fish habitat.

8.4.1.5 Flood Training Walls

Segment 3C Phase 3 will include the construction of flood training walls (Figure 3.4-1) to redirect overbank floodflows back into the river channel. The flood training walls would be located on the eastern and western sides of the river. On the eastern bank, a total of 860 lf of wall would extend from the I-280 Bridge abutment to Almaden Avenue (Figure 3.4-1). On the western bank, a combination of 973 lf of flood training wall and 620 lf of earthen berm would extend from the river to the edge of the Children's Discovery Museum parking lot and then to and along the State Route 87/I-280 connector.

The flood training walls would not be completed and made functional until the Lower Guadalupe River Project is completed

8.4.1.6 Environmental Mitigation

The Corps and SCVWD have incorporated specific environmental mitigation commitments into the Modified Project to offset any adverse effects resulting from construction of project features.

A mitigation and incremental cost analysis has been prepared, substantially in accord with the Corps' guidance, "Mitigation Planning and Recommendations" (paragraph 7-36, ER 1105-2-100). The principal resource loss is to riverside riparian forest — SRA cover — and associated river resources that provide critical habitat for threatened steelhead and essential habitat for chinook salmon. The analysis examines the costs of providing mitigation in three locations: onsite in the primary construction area between I-280 and I-880, and offsite immediately downstream in Reach A and on Guadalupe Creek. Mitigation of 22,892 lf of SRA cover is proposed at an estimated cost of $10.6 million. It is concluded that the significance of the resources lost justifies this mitigation. The analysis is included by reference and is on file at the Corps' Sacramento District office as part of the project record.

The Modified Project includes preventative measures to avoid and minimize potential adverse effects on riparian vegetation and aquatic resources during construction of Segments 3A, 3B, and 3C Phase 3 (Section 3.4.3.1). The measures will include:

- Vegetation protection plan;
- Erosion and sediment control plan;
- Toxic materials control and spill-response plan;
- Fish management in the construction area;
- Construction period limits;
- Bay Area Air Quality Management District feasible control measures for PM_{10} emissions;

- Traffic management;
- Parking management; and
- Cultural resources management.

The Modified Project also includes measures to compensate for adverse project effects, including:

- Plant 21 acres of native riparian vegetation.
- Plant 22,892 lf of SRA cover vegetation. Onsite SRA cover mitigation lengths will be 575 lf in Segment 1; 1,081 lf in Segment 2; 878 lf in Segment 3A; 56 lf in Segment 3B; and 480 lf in Woz Way to Park Avenue Bypass Reach. Offsite SRA cover mitigation lengths will be 7,848 lf in Reach A and 12,027 lf along Guadalupe Creek.
- Protect the project's compensatory mitigation components in perpetuity.
- Maintain water temperature by planting riparian vegetation to replace shade lost as a result of project construction.
- Maintain up to 25,190 sf of river-run gravel between I-880 and I-280.
- Include a low-flow channel in the armored sections of the riverbed to provide fish passage.
- Replace instream fish habitat by providing rock weirs and vanes, root wads, deflector logs, and boulders.

The MMP includes adaptive management to achieve mitigation objectives and provide for implementation of remedial actions (Appendix 3). Key components of the adaptive management process are:

- Identifying indicators for habitat values and ecological functions. Indicators include:
  - Riparian vegetation;
  - SRA cover vegetation;
  - Water temperature;
  - Anadromous fish spawning habitat;
  - Anadromous fish and rearing habitat
  - Anadromous fish occurrence; and
  - Mercury transport and the potential for methylation of mercury.
- Setting measurable objectives, including numerical and descriptive goals for the indicators.
- Monitoring indicators
- Failure to meet measurable objectives will trigger evaluation of the cause of the failure and selection of appropriate remedial actions by the Adaptive Management Team.

8.4.2 Recreation

A continuous riverwalk trail system will be developed between Coleman Avenue and Park Avenue. The riverwalk system will be asphalt paved and 12 or 18 feet wide to accommodate both flood protection maintenance use and the estimated 1.3 million annual visitors to the project area. Section 3.4.2.8 of this Report describes the recreation and trail features of the Modified Project in detail.

8.4.2.1 Recreation Betterments

Federal recreational costs will not include any costs for betterments or the value of separable recreation lands other than those necessary for access, parking, public health, and safety. Recreational betterments include large trees, increased quantities of 15-gallon and 24 inch box trees, riverwalk embellishments such as additional trails, a concrete mow band and metal edging, concrete surface color and finish upgrades, park furnishings, and stone veneer. The estimated cost of these betterments is $6.8 million for the Modified Plan.

8.4.3 Environmental

8.4.3.1 Streambank Protection

Although the underground bypass minimizes effects on vegetation by eliminating most of the bank protection originally proposed for this section of the river under the Authorized Project, some protection is still required in association with the construction of inlets and outlets. The proposed bypass system will minimize riverbank armoring. The total amount of protection under the Modified Project is approximately 5,532 lf of riverbank and 2,635 lf of invert armoring.

8.4.3.2 Low-Flow Channel

A low-flow channel to provide for fish will be constructed in the reaches where the riverbed is armored. Check structures in the low-flow channel will provide desirable hydrologic complexity for fish habitat and a means of maintaining a minimum water depth of 1.2 feet at flows as low as 0 to 1 cfs to reduce summer water temperatures. Low-flow channels will be constructed in Segments 3A and 3B.

8.4.3.3 Planting Riparian Vegetation

The Modified Project includes planting SRA cover vegetation within 15 feet of the wetted perimeter of the summer low-flow channel water level. Onsite SRA cover vegetation mitigation will be provided in Segments 1, 2, 3A, 3B, and the Woz Way to Park Avenue Bypass Reach. Offsite SRA cover vegetation mitigation will be provided in Reach A and on Guadalupe Creek.

Reach A. Reach A is an offsite mitigation area located immediately downstream from the project area between Airport Parkway and I-880 (Figure 3.4-2). Mitigation will include 6,305 lf of riparian vegetation along the river to provide SRA cover (Table 5.4-9). Instream geomorphic features, including rock weirs and vanes, root wads, and deflector logs, will also be installed to replace affected SRA cover.

Guadalupe Creek. The Guadalupe Creek offsite mitigation site (Figure 3.4-2) is bordered upstream by Masson Dam and downstream by the Almaden Expressway. Mitigation will include planting of 10,781 lf of riparian vegetation on both sides of the creek (Table 5.4-9). Operation of instream seasonal groundwater recharge ponds will be permanently discontinued in this reach of Guadalupe Creek.

8.4.3.4 Spawning Gravel

Mitigation includes placement of appropriately sized gravels in specific spawning gravel bed locations. Spawning gravel mitigation (up to 25,190 sf) will be provided within the onsite mitigation areas in locations that are yet to be determined.

8.4.3.5 Aesthetics

Aesthetics has been an integral part of the project beginning with the 1985 feasibility report. Aesthetics has been incorporated into design of the project via close coordination with SCVWD, City of San Jose, and San Jose Redevelopment Agency. Contributions to aesthetics are provided in a number of ways. The Bypass System Alternative and Refined Bypass System Alternative make important contributions to protecting aesthetics by reducing impacts on SRA cover. Besides its value to fish and wildlife, riparian vegetation, and in particular SRA, is an important aesthetic resource being protected and mitigated.

The channel design is curvilinear and contains a variety of features such as training walls, retaining walls, multiple inlets to the covered bypass system, stone terraces, gabion baskets, gabion terraces, 30-acre overflow area with 21-acre riparian habitat mitigation, rock weir inlet to secondary channel in riparian habitat area, SRA mitigation plantings of 3,000 lf that shade the river's low flows, low flow channel with integral features (e.g. boulders, concrete sills, rock weirs and vanes, root wads, deflector logs) to concentrate flows in pools and riffles to assist fish, replacement of fish spawning gravels, and recreation facilities with associated landscaping.

Immediately downstream in Reach A, SRA mitigation of 7,848 lf is being provided. This variety of project designs for flood protection, recreation, and fish and wildlife greatly contribute to aesthetics by providing a pleasing stream setting in close association with the redeveloped urban environment while performing their other important functions. Further refinement of project design is continuing and may include added features for improving project aesthetics (e.g. color and motif designs for concrete structures).

8.4.4 Flood Control Plan Development

The recommended project modifications continue to refine the flood control project that was presented in the 1985 Feasibility Report and subsequently authorized by Congress in the Water Resources Development Act of 1986. Project changes have been made as more detailed engineering and design studies were performed, local planning and redevelopment requirements evolved, and environmental protection requirements changed. Table 8.4-1 is a reach by reach comparison of changes to the authorized project's flood control features that were approved in the 1991 GDM that was subsequently revised in 1993, and those that are currently being recommended.

8.5 Project Benefits

8.5.1 Flood Damage Reduction

Economic benefits have been developed in accordance with ER 1105-2-100, Guidance for Conducting Civil Works Planning Studies. For the purposes of the economic analysis, project benefits are defined as the remaining benefits. Remaining flood damage reduction

TABLE 8.4-1 Historical Summary and Comparison of Key Flood Control Features and Modifications of the Guadalupe River Project, Downtown San Jose, California

Reach and Feature	Authorized Plan (1985 FR/EIS)[1]	Updated FR Plan (1991 GDM)[2]	Approved NED (1993 Revised GDM)[3]	Approved LPP (1993 Revised GDM)[4]	Proposed Modified NED (2001 GRR/EIR-SEIS)[5]
SEGMENT 1: Interstate Highway 880 to Hedding Street					
Left Bank:	Excavated bank with 1V:2-1/2H side slope, rip rap protection, and a 170' wide bench.	Same as 1985 FR Plan except with IV:2H side slope and a 240' wide bench	Same as updated FR Plan.	Excavated bench with 1V:10H side slope. Bench width varies from 260-360' w/mounds, secondary channel and mitigation plantings.	Construction completed, same as previous LPP
Right Bank:	Natural bank.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Construction completed, same as previous LPP
Invert:	Natural and earth invert w/grade control structures.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan except ACM under I-880 and Hedding St. Bridges.	Construction completed, same as previous LPP
Maintenance Roads:	Top of, left bank with access ramp to channel invert.	Same as 1985 FR Plan.	Same as updated FR Plan.	Along excavated bench on left bank through reach.	Construction completed, same as previous LPP
Bridges:	Hedding St. -Replace as a preproject condition.	Hedding St. -Extension (new span).	Hedding St. -Same as updated FR Plan.	Hedding St. -Same as NED Plan.	Construction completed, same as previous LPP

[1] This is the plan presented in the project's 1985 Feasibility Report (FR) that was the basis for Congressional authorization in the Water Resources Development Act of 1986.

[2] The 1985 FR plan was updated in 1991 to reflect the completion of design studies, the need to correct invalid design assumptions, and changes in mitigation lands and features.

[3] The 1993 General Design Memorandum (GDM) National Economic Development (NED) Plan is a further refinement of the 1985 FR plan due to changes in local redevelopment plans and completing plans for Guadalupe River Park. The GDM NED plan is a single purpose flood control plan developed to establish the cost sharing allocations.

[4] The 1993 GDM Locally Preferred Plan (LPP) is a refinement of the 1985 FR plan that is fully compatible with local redevelopment planning objectives and the plans for Guadalupe River Plan, and recreation is included as a project purpose. This is the approved plan for construction of project segments 1 and 2.

[5] Proposed modifications to the remaining unconstructed portion of the project are described in the 2001 General Reevaluation Report/Environmental Impact Report/Supplemental Environmental Impact Statement (GRR/EIR/SEIS), responsive to requirements regarding endangered species and project mitigation measures.

TABLE 8.4-1 Historical Summary and Comparison of Key Flood Control Features and Modifications of the Guadalupe River Project, Downtown San Jose, California

Reach and Feature	Authorized Plan (1985 FR/EIS)[1]	Updated FR Plan (1991 GDM)[2]	Approved NED (1993 Revised GDM)[3]	Approved LPP (1993 Revised GDM)[4]	Proposed Modified NED (2001 GRR/EIR-SEIS)[5]
SEGMENT 2: Hedding Street to Taylor Street					
Left Bank:	Excavated bank with 1V:2-1/2H slope, riprap slope protection, and a 170' wide bench.	Same as 1985 FR Plan except1V:2H side slope and a 240' wide bench.	Same as updated FR Plan.	Excavated bench with 1V:10H side slope. Bench width varies 260-360' w/mounds, secondary channel and mitigation plantings.	Construction completed, same as previous LPP
Right Bank:	Natural bank.	Same as 1985 FR Plan.	Same as updated FR Plan.	Natural bank.	Construction completed, same as previous LPP
Invert:	Natural and earth invert w/grade control structures.	Same as 1985 FR Plan.	Same as updated FR Plan.	Natural and earth invert.	Construction completed, same as previous LPP
Maintenance Road:	Top of left bank with access ramp to channel invert.	Same as 1985 FR Plan.	Same as updated FR Plan.	Along excavated bench on left bank through reach.	Construction completed, same as previous LPP
SEGMENT 2 (cont'd): Taylor Street to Coleman Avenue					
Left Bank:	Excavated bench with 1V:2-1/2H side slope (riprap protection) and a 125' wide bench.	Same as 1985 FR Plan except 1V:2H side slope (riprap protection) and a 235' wide bench.	Same as updated FR Plan.	Excavated bench with 1V:10H side slope. Bench width varies from260-360' w/mounds.	Construction completed, same as previous LPP
Right Bank:	Natural bank.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Construction completed, same as previous LPP
Invert:	Natural and earth invert w/grade control structures.	Same as 1985 FR Plan.	Same as updated FR Plan.	Natural and earth invert except for ACM under and downstream of Coleman Ave. Bridge	Construction completed, same as previous LPP
Maintenance Road:	On top of left bank.	Same as 1985 FR Plan.	Same as updated FR Plan.	Along excavated bench and 12' above bench.	Construction completed, same as previous LPP

TABLE 8.4-1 Historical Summary and Comparison of Key Flood Control Features and Modifications of the Guadalupe River Project, Downtown San Jose, California

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Bridges:	Taylor St. -Relocate	Taylor St. -Modify and extend with new span.	Same as updated FR Plan. (Taylor St. & Hobson St.)	Taylor St. -Demolish and replace with State Route 87 flyway.	Construction completed, same as previous LPP
	Hobson St. -Demolish	Hobson St. -Same as 1985 FR Plan.		Hobson St. -Same as NED Plan.	Construction completed, same as previous LPP
SEGMENT 3: Coleman Avenue to UPRR Bridges					
Channel:	Trapezoidal channel – Bottom width -50'-60' Top width -130'-140' 1V:2H side slope (riprap protection).	Trapezoidal channel – Bottom width -100' Top width -180'	Trapezoidal channel -Same as updated FR Plan.	Trapezoidal channel – Bottom width -70' to 155'1V:2 1/2H side slope Left Bank -Smooth curved gabion terraces. Right Bank -Undulating gabion terraces through reach.	Coleman Ave to box culvert outlet- Same as previous LPP except right bank: gabions underneath Coleman Ave., constant sloped vertical concrete retaining wall, 6'-22' high. Box culvert outlet to UPRR Bridges- Natural channel and banks.
Invert:	Riprap.	Same as 1985 FR Plan.	Same as updated FR Plan.	ACM protection.	Coleman Ave to box culvert outlet- Same as previous LPP Box culvert outlet to UPRR Bridges- Natural channel
Maintenance Road:	On top of left bank.	Same as 1985 FR Plan.	Same as updated FR Plan.	Along left bank (mid-slope) w/access to invert.	Left bank: split maintenance roads, one underneath Coleman Ave. (mid-slope) conforming to road on top of bank 500' upstream, then one road remaining on top of bank. Right bank: On top of bank

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SEGMENT 3 (cont'd): UPRR Bridges to New Julian Street					
Left Bank:	Excavated bench 100' wide and riprap protection.	Same as 1985 FR Plan.	Same as updated FR Plan.	Gabion and concrete terraces w/gabion infill at New Julian St. Bridge transitions to gabion terraces downstream.	Natural bank.
Right Bank:	Natural bank.	Same as 1985 FR Plan	Same as updated FR Plan.	Gabion and concrete terraces w/gabion infill at New Julian St. Bridge. Natural bank from Old Julian St. Bridge to SPTC #4.	Natural bank.
Invert:	Natural and earth invert.	Same as 1985 FR Plan.	Same as updated FR Plan.	ACM under New Julian St. Natural invert transitioning to earth downstream of SPTC #4.	Natural invert.
Bridges:	New Julian St. -No modifications. Old Julian St. -Left abutment modified.	New Julian St. -Same as 1995 FR Plan. Old Julian St. -Demolish and replace.	New Julian St. -Same as updated FR Plan. Old Julian St. -Demolish.	New Julian St. -Same as NED Plan. Old Julian St. -Same as NED Plan.	New Julian St. - same as previous NED Plan Old Julian St. – same as previous NED Plan
Maintenance Road:	On top of left bank with ramp to excavated bench. SPTC #1- Demolish SPTC #2 –Replace SPTC #3 -Replace SPTC #4 -Replace	On top of left bank with ramp to excavated bench. SPTC #1, #2, #3- Demolish SPTC #4 -Replace	Same as updated FR Plan. SPTC #1, #2, #3, #4 -Same as updated FR Plan.	Continuous at toe of slope along left bank. SPTC #1, #2, #3, #4- Same as NED Plan.	Top of left and right banks. Same as NED Plan

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SEGMENT 3 (cont'd): New Julian Street to Santa Clara Street					
Left Bank:	Natural bank.	Same as 1985 FR Plan.	Natural bank except at New Julian St. Bridge. Gabion terrace w/concrete terrace w/gabion infill.	Same as NED Plan.	Natural bank, except bank protection for 340' down-stream of Santa Clara St.
Right Bank:	Excavated bench with 1V:2-1/2H side slope (riprap slope protection) and 150' wide bench.	Same as 1985 FR Plan except 140' wide bench.	Excavated bench 1V:10H side slope w/mounds. Width varies 15-230 feel. Side slope above excavated bench is 1V:3H. Concrete terrace w/gabion infill at Santa Clara St. Bridge. Gabion mattress along right bank at confluence w/Los Gatos Creek.	Same as NED Plan.	Inlet structure and bank protection for 340' down-stream of Santa Clara St. Inlet structure and bank protection for 150' up-stream of St. John St.
Invert:	Natural and earth invert.	Same as 1985 FR Plan.	Natural downstream of Santa Clara St. except for ACM downstream of Santa Clara St. and upstream of New Julian St. Concrete channel under and upstream of Santa Clara St. Bridge.	Same as NED Plan.	Natural channel bottom with CCM invert protection for 340' downstream of Santa Clara St. 0-14 invert stabilization structures as needed to reduce channel scouring.
Bridges:	St. John St. -Modified by extension.	St. John St. -Demolish.	St. John St. -Demolish.	St. John St. -Same as NED Plan	Same as previous NED Plan
Maintenance Road:	On top of right bank.	Same as 1985 FR Plan.	Right bank on excavated bench and on top of right bank.	Same as NED Plan.	On top of right bank then splits at Santa Clara inlet with one on top of bank and one sloping beneath Santa Clara (mid-slope).

TABLE 8.4-1 Historical Summary and Comparison of Key Flood Control Features and Modifications of the Guadalupe River Project, Downtown San Jose, California

Reach and Feature	Authorized Plan (1985 FR/EIS)[1]	Updated FR Plan (1991 GDM)[2]	Approved NED (1993 Revised GDM)[3]	Approved LPP (1993 Revised GDM)[4]	Proposed Modified NED (2001 GRR/EIR-SEIS)[5]
Other:	Confluence w/Los Gatos Creek (downstream of Santa Clara St: on left bank).	Confluence w/Los Gatos Creek -Same as 1985 FR Plan.	Confluence w/Los Gatos Creek -Same as updated FR Plan.	Confluence w/Los Gatos Creek -Same as NED Plan.	Confluence w/ Los Gatos Creek Same as previous NED Plan.
SEGMENT 3 (Cont'd): Santa Clara Street to San Fernando Street					
Left Bank:	Vertical concrete wall.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Same as previous NED Plan.
Right Bank:	Concrete steps.	Same as 1985 FR Plan.	Gabion terraces (undulating) transitions to gabion and concrete terraces with gabion infill (undulating).	Same as NED Plan.	Same as previous NED Plan.
Invert:	Concrete invert.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Same as previous NED Plan.
Maintenance Road:	Top of right bank with invert access.	Same as 1985 FR Plan.	Mid-slope and top of right bank.	Same as NED Plan.	Same as previous NED Plan.
Bridges:	San Fernando St. - Replaced by others.	No modification.	Same as updated FR Plan.	Same as NED Plan.	Same as previous NED Plan.
SEGMENT 3 (cont'd): San Fernando Street to Park Avenue					
Left Bank:	Exit from box culvert. Vertical concrete wall.	Same as 1985 FR Plan.	Gabion and concrete terraces upstream of bypass exit to Park Ave. Vertical concrete retaining wall from box culvert exit through San Fernando St.	Same as NED Plan.	Same as previous NED Plan.
Right Bank:	Vertical concrete wall.	Same as 1985 FR Plan.	Gabion and concrete terraces with gabion infill (undulating). Concrete terraces under San Fernando St. Bridge.	Same as NED Plan.	Same as previous NED Plan.

TABLE 8.4-1 Historical Summary and Comparison of Key Flood Control Features and Modifications of the Guadalupe River Project, Downtown San Jose, California

Reach and Feature	Authorized Plan (1985 FR/EIS)[1]	Updated FR Plan (1991 GDM)[2]	Approved NED (1993 Revised GDM)[3]	Approved LPP (1993 Revised GDM)[4]	Proposed Modified NED (2001 GRR/EIR-SEIS)[5]
Invert:	Concrete channel.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Same as previous NED Plan.
Maintenance Road:	Access ramps to channel invert.	Same as 1985 FR Plan.	Mid-slope right bank w/access to channel invert.	Same as NED Plan.	Same as previous NED Plan with one on top of bank also.
SEGMENT 3 (cont'd): Park Avenue to Woz Way					
Channel:	Natural channel bypassed by2900' long box culvert. Maintenance access ramps to channel invert.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Construction completed by local sponsor, except for inlet & outlet structures. Same as previous NED Plan.
Left Bank:	Natural and existing earth bank between Woz Way and Park Ave	Same as 1985 FR Plan.	Natural and existing earth bank between Woz Way and Park Ave. Concrete and gabion terraces at Woz Way and Park Ave. Bridges.	Same as NED Plan.	Same as previous NED Plan.
Right Bank:	Same as left bank.	Same as 1985 FR Plan.	Same as updated FR Plan. .	Same as NED Plan.	Same as previous NED Plan.
Invert:	Natural between Woz Way and San Carlos St. Earth from San Carlos St. through Park Ave.	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Same as previous NED Plan
Bypass Channel: (Woz-Park Bypass Culvert)	Concrete Box Culvert Bypass Channel – Length - upstream ext. – 360' downstream ext – 150' existing – 2025' Width – 46' Wall Height – 20'	Same as 1985 FR Plan.	Same as updated FR Plan.	Same as NED Plan.	Construction completed by local sponsor except for inlet & outlet structures. Same as NED Plan

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SEGMENT 3 (Cont'd): Woz Way to I-280					
Entrance Structures: (Flood Training Walls)	Right Bank -Asphalt concrete curb. Left Bank -Raised SPTC railroad embankment	Right Bank -Same as 1985 FR Plan. Left Bank -Sump area and a side weir into channel.	Same as updated FR Plan.	Same as NED Plan.	Right bank-Flood wall. Left bank-Earthen berm and floodwall.
Diversion Structure:	Diversion structure to existing box culvert upstream of Woz Way.	Ogee weir at inlet to new box culvert bypass channel extension.	Same as updated FR Plan.	Same as NED Plan.	Same as LPP Plan.
Left Bank:	Vertical concrete wall.	Same as 1985 FR Plan.	Vertical concrete wall. Gabion terraces and concrete terraces with gabion infill.	Same as NED Plan.	Gabion terraces and concrete terraces with gabion infill. Vertical concrete wall upstream of diversion structure.
Right Bank:	Vertical concrete wall to Woz Way.	Same as 1985 FR Plan.	Gabion terrace and concrete terrace w/gabion infill (undulating) downstream of weir.	Same as NED Plan.	Gabion terrace and concrete terrace w/gabion infill (undulating).
Invert:	Short concrete invert section downstream and upstream of diversion.	Same as 1985 FR Plan.	Earth and ACM (under I-280 only). Two riprap grade control structures at Woz Way.	Same as NED Plan.	Natural invert to 150' upstream of Woz Way. CCM remainder of reach.
Maintenance Road:	Access ramps to channel invert.	Same as 1985 FR Plan.	Mid-slope right bank continuous through reach w/access ramps to channel invert.	Same as NED Plan.	Same as LPP Plan.

benefits are the same as total project benefits because the project will not be operational for flood damage reduction until Segment 3 is completed. Prices were updated to October 2000 price levels based on the economics from the 1991 GDM (as revised in 1993).

Damages were based on 1990 conditions. Benefits and costs are expressed as average annual values at a current Federal discount rate of 6-5/8 percent and a project economic life of 50 years. In 1991, buildout of the floodplain was projected by the year 2014; therefore, no development was projected beyond that period. For the current damage and benefit analysis, the project base year of 2004 (the year in which significant benefits will accrue from project construction) and future growth were not reevaluated. No plan formulation was redone. Future growth was not reevaluated because the existing Benefit-Cost (B/C) ratio is greater than one, future growth had been evaluated previously, and ER 1105-2-100 (E-19k(2)) allows an abbreviated analysis of future benefits to determine project feasibility if the B/C ratio is greater than one. Comparing results from the previous economic analysis can show the sensitivity of the inundation reduction benefits to the inclusion of future growth. Future growth for the 1991 analysis showed that benefits would increase by 13 percent.

The Economics Report is provided in Appendix 7. Table 8.5-1 presents the estimated annual damages for both with-project and without-project conditions. In addition, Table 8.7-1 identifies the estimated annual benefits for the Modified Project. The annual benefits represent the difference in damages between the with-project and without-project conditions.

8.5.2 Recreation

The recreation plan previously approved in the 1991 GDM (as revised in 1993) remains largely unchanged. The types and numbers of basic facilities remain the same, only some additional betterments are included at the request of the local partner who will pay 100 percent of such additional costs. Recreation use and benefits of the approved plan have been updated resulting in increased use and benefits compared to the 1992 plan. Recreation facilities have been constructed or are under construction for Segments 1, 2, and 3C. Benefits and costs of the overall recreation plan and of the facilities remaining to be constructed in Segments 3A and 3B have been analyzed and shown in Table 8.5-2.

Also, an analysis of the Federal share of recreation costs compared with the Federal share of total project costs shows that recreation adds only 1.04 percent to the total project and 1.24 percent to the remaining project construction. This is well within the 10 percent limitation imposed by Federal policy.

8.6 Costs

8.6.1 Total Project Costs

Table 8.6-1 contains the estimated total project first costs for the 1993 Authorized NED Project, the 1993 Locally Preferred Project and the new NED/LPP (Modified Project – Refined Bypass System). Table 8.6-1 also indicates those portions of the 1993 NED and LPP that have been constructed. As described in Chapter 2, the Authorized Project with Additional Mitigation cannot be implemented and is not included in the table. A reach by

TABLE 8.5-1. Total Average Annual Equivalent Damages and Benefits [a]

Benefit Category	Without-Project Damages ($1,000)	With-Project Damages ($1,000)	Benefits ($1,000)
Single-Family Residential	$1,419	$247	$1,172
Multi-Family Residential	$246	$53	$193
Commercial	$23,612	$4,139	$19,473
Industrial	$432	$114	$318
Public	$737	$142	$595
Emergency Costs	$395	$75	$320
Auto Damages	$279	$35	$244
Road Damages	$134	$27	$107
Total	$27,254	$4,832	$22,422
Savings in Flood Insurance Costs			$192
Total Annual Benefits			**$22,614**

[a] Existing Conditions 1990; October 2000 Price Levels; Base Year 2004; Project Life 50 Years; 6-3/8 percent Interest Rate

TABLE 8.5-2. Annual Recreation Benefits and Costs [a]

Category	Total-Project ($1,000)	Remaining ($1,000)
Benefits	$7,917	$3,025
Costs	$1,556	$933
B-C Ratio	**4.6:1**	**3.2:1**

[a] Existing Conditions 1990; October 2000 Price Levels; Base Year 2004; Project Life 50 Years; 6-3/8 percent Interest Rate

reach comparison of the 1993 NED and LPP can be found in Table 3-1 of the 1991 GDM (as revised in 1993).

For comparative purposes, Table 8.6-2 presents the estimated total remaining project costs for the New NED/LPP (Modified Project – Refined Bypass System). The estimated costs include the recommended project modifications; the recommended mitigation plan; and the associated real estate, planning, engineering, design and construction management. Adaptive management and monitoring costs for the initial 3 years are considered project costs and are included in the Fish and Wildlife Facilities. After the third year, these costs are considered 100 percent non-Federal as part of the non-Federal partner's OMRR&R costs. Project costs represent a fully funded estimate at October 2000 price levels. The total preliminary remaining cost estimate for the Modified Project – Refined Bypass System (Proposed Action/Recommended Plan) is $151.6 million.

TABLE 8.6-1. Estimated Total Project Costs [a]

		Current Approved NED			Current Approved LPP			NEW NED	NEW LPP
Acct. No.	**Item**	**Total ($1,000)**	**Const. ($1,000)**	**Not Const. ($1,000)**	**Total ($1,000)**	**Const. ($1,000)**	**Not Const. ($1,000)**	**Total ($1,000)**	**Total ($1,000)**
01	Lands and Damages	$35,966	$5,530	$30,433	$43,642	$7,122	$36,520	$29,972	$31,166
02	Relocations	$45,147	$18,928	$26,219	$45,147	$18,928	$26,219	$50,750	$50,750
06	Fish and Wildlife Facilities	$8,774	$1,718	$7,056	$8,774	$1,718	$7,056	$13,919	$13,919
09	Channels and Canals	$25,646	$6,965	$18,681	$34,398	$13,867	$20,531	$69,076	$70,551
14	Recreation Facilities	$636	$407	$229	$636	$407	$229	$945	$945
15	Floodway Control and Diversion Structures	$11,355	$0	$11,355	$11,355	$0	$11,355	$5,602	$5,602
18	Cultural Resources Preservation	$786	$324	$462	$786	$324	$462	$651	$651
30	Planning, Engineering, and Design	$33,700	$30,064	$3,636	$34,054	$30,380	$3,674	$44,596	$44,817
31	Construction Management	$6,492	$1,977	$4,516	$7,908	$2,408	$5,500	$8,389	$8,399
	Total Project Cost	**$168,500**	**$65,913**	**$102,587**	**$186,700**	**$75,154**	**$111,546**	**$223,900**	**$226,800**

[a] Fully Funded, October 2000 Price Level

TABLE 8.6-2. Estimated Total Remaining Project Costs [a]

Acct.	Item	Modified Project ($1,000)
01	Lands and Damages	$24,044
02	Relocations	$31,822
06	Fish and Wildlife Facilities	$12,201
09	Channels and Canals	$56,684
14	Recreation Facilities	$538
15	Floodway Control and Diversion Structures	$5,602
18	Cultural Resources Preservation	$327
30	Planning, Engineering, and Design	$14,437
31	Construction Management	$5,991
	Total Project Cost (Proposed Action/Recommended Plan)	**$151,646**

[a] Fully Funded, October 2000 Price Level.

8.6.1.1 Lands and Damages

Lands and damages for the Modified Project are described in Appendix 5, Real Estate.

8.6.1.2 Relocations

Relocations for the LPP were described in the 1991 GDM (as revised in 1993) (U.S. Army Corps of Engineers, 1993). The Refined Bypass System Alternative will require relocation of the same infrastructure as identified in the GDM, but no new relocations will be required. Some of the required relocations are described in the following paragraph.

The Refined Bypass System Alternative alignment may require excavation beneath River Street, St. John Street, remnants of Old Julian Street, Coleman Avenue, Santa Clara Street, and UPRR spurs. Existing gas and sewer lines at St. John Street will require relocation with the bypass systems alternative. Existing facilities, such as gas, power, and communication lines along New Julian Street and remnants of Old Julian Street will also require relocation. Several of these facilities could possibly be protected in place during construction, but this will not be known until the design phase. For more detailed discussion refer to Appendix 4H.

A general description of items included in the cost estimating accounts is given in EC 1110-2-538. Project specific items are described below.

8.6.1.3 Fish and Wildlife Facilities

Refer to description of Fish and Wildlife facilities in Sections 8.2.4, 8.4.1, and 8.4.3, and Chapter 3 of this Report, and in the MMP (Volume II, Appendix 3).

8.6.1.4 Channels and Canals

Work included in the Channels and Canals account is described in Sections 8.4.1 and 8.4.3 and in Chapter 3 of this Report.

8.6.1.5 Recreation Facilities

Recreation Facilities are discussed in Section 8.4.2 of this Report and in Appendix 8, Recreation.

8.6.1.6 Cultural Resources Preservation

Cultural Resources Preservation items in compliance with Section 106 of the national Historic Preservation Act are discussed in Section 8.2.4 and Chapters 1, 4, 5, and 6 of this Report.

8.6.1.7 Planning, Engineering, and Design

Planning, Engineering, and Design includes preparation of this document, model studies, plans and specifications and other work required for the engineering and design of the Modified Project.

8.6.1.8 Construction Management

The Construction Management account includes all work required during construction to provide inspection and construction management services.

8.6.2 Real Estate Considerations

8.6.2.1 Adjacent Land Uses

The primary area associated with the proposed modifications is along the corridor of the Guadalupe River between Coleman Avenue to the north and Park Avenue to the south. This area is heavily urbanized, and the river is flanked by industrial, commercial, residential, and public park uses. The Guadalupe River is one of the major drainage systems in the Santa Clara Valley. Historically, it has experienced periodic flooding as a result of high intensity rainstorms. The channel improvement easement (CIE) is essentially a swath covering the river and riverbank area to the west and the riverbank and additional areas along the corridor to the east. The temporary construction easement (TCE) is essentially a swath that parallels the bypass system easement to the east. On the west side of the river, the TCE is only over selected areas rather than a swath. The river and required easement pass under the raised I-280 freeway to the south and under the Coleman Avenue Bridge to the north. The properties within the subject easement area are primarily the riverbed and banks; public parks; parking and walkway areas; plus industrial, commercial, and residential land. The areas required for project construction reportedly do not include any building improvements. There are no known mineral deposits of any significant value.

8.6.2.2 Need For Land

The Refined Bypass System Alternative will require additional right-of-way acquisition from UPRR lands and Sobrato Development Companies' lands. The Refined Bypass Alternative would eliminate the need to widen the natural channel within UPRR lands as was required by Segment 3A, thus avoiding effects to existing vegetation and landforms.

However, UPRR would be restricted as to what could be developed or constructed above the bypass system. Construction of the proposed bypass alternative will have to cross beneath an existing UPRR spur line.

Sobrato Development Companies purchased their land from Food Machinery Corporation (FMC) in June1998. Sobrato Development Companies has constructed two five-story office buildings, and a five-level parking garage is under construction. Sobrato Development Companies is also planning to construct a seven-story office building on the site. Construction of the bypass alternative will need to be compatible with this future development.

8.6.3 HTRW Considerations

All hazardous, toxic, and radioactive waste (HTRW) sites, listed and unlisted, discovered within the project limits of the Guadalupe River Project will require special consideration for the excavation and disposal of earth quantities. The Corps, in coordination with SCVWD, will develop a contingency plan outlining a course of action in the event that unlisted HTRW sites are uncovered during construction. This contingency plan will outline the immediate course of action to follow in the event HTRWs are uncovered. SCVWD will be the lead agency in implementing the contingency plan. All costs associated with the engineering and design of response measures and cleanup, including any necessary studies and investigations, are the responsibility of the non-Federal partner.

Lands of the UPRR and Sobrato Development Companies are known sites containing hazardous materials. Remediation costs on UPRR are not likely to change from those expected for the construction of the previous Segment 3A flood protection improvements. FMC has been identified as the responsible party for the onsite hazardous materials. Groundwater contamination is also a concern at this site. Remediation costs to construct the Refined Bypass System Alternative across former FMC lands are expected to be significant. Upon the determination of the selected bypass alignment and the limits for the required right-of-way, remediation costs will be formulated.

8.7 Economic Analysis

The estimated remaining project first costs and OMRR&R cost have been developed using the Corps' MCACES cost estimating system. The costs are allocated between the project purposes. These costs, along with total annual costs, annual benefits, net economic benefits, and the benefit-to-cost ratios are shown on Table 8.7-1. These values are based on fully funded October 2000 price level, an interest rate of 6-3/8 percent, a 50-year period of analysis, and a project base year of 2004.

8.7.1 Annualized Costs

The total first cost of the alternatives is defined as the construction cost plus the cost to complete plans and specifications. The total economic investment includes the cost of interest during the construction period and the plans and specifications period of analysis. Therefore, the total investment is equal to the first cost plus the total interest payments. By amortizing the total investment of the alternative over the 50-year project life, the average

annual cost can be estimated. The total average annual cost of the project is the sum of the average annual implementation cost and the OMRR&R costs.

TABLE 8.7-1 Economic Analysis of the Modified Project (Remaining Costs)

Acct.	Item	Flood Protection ($1,000)	Recreation ($1,000)	Total ($1,000)
01	Lands and damages	$24,044	$0	$24,044
02	Relocations	$31,822	$0	$31,822
06	Fish and wildlife facilities	$12,201	$0	$12,201
09	Channels and canals	$56,684	$0	$56,684
14	Recreation facilities	$0	$538	$538
15	Floodway control and diversion structures	$5,602	$0	$5,602
18	Cultural resources preservation	$327	$0	$327
30	Planning, engineering, and design	$14,405	$32	$14,437
31	Construction management	$5,917	$74	$5,991
	Subtotal	**$151,002**	**$644**	**$151,646**
	less cultural resources	($327)	$0	($327)
	interest during construction	$19,866	$85	$19,951
	Total gross investment costs	**$170,541**	**$729**	**$171,270**
Estimate of annual costs				
Interest and amortization (includes interest during construction)		$11,390	$49	$11,439
OMRR&R		$1,363	$884	$2,247
Annual water temperature remedial actions		$100	$0	$100
Annual adaptive management		$100	$0	$100
	Total annual costs	**$12,953**	**$933**	**$13,886**
Average annual benefits				
Flood damage reduction		$22,614	$0	$22,614
Recreation		$0	$3,171	$3,171
	Total annual benefits	**$22,614**	**$3,171**	**$25,785**
Benefit-to-cost ratio		1.75	3.40	1.86

Note: fully funded October 2000 price levels; interest rate of 6-3/8 percent; 50-year period of analysis; project base year of 2004.

8.8 Plan Accomplishments

8.8.1 Flood Protection

Currently, the Guadalupe River poses the threat of causing millions of dollars in flood damage to thousands of homes and businesses in downtown San Jose. The objective of the Guadalupe River Project is to manage periodic flooding, provide 100-year flood protection, and minimize associated adverse effects and costs.

8.8.2 Recreation

With the population of the Santa Clara Valley increasing, the importance of providing additional places for public recreation has been recognized. The Guadalupe River system provides opportunities for many forms of recreation, including walking, jogging, and bicycling along the river's edge, as well as organized events such as concerts, ethnic celebrations, and other events that the river's environs and its many uses. This project will increase recreational opportunities by increasing public access to the riverside trail, as well as providing open space, picnic facilities, trail connections, viewing locations, and opportunities for public education. A combination of gardens, plazas, trail systems, refurbished major streetscapes, revegetation, and riparian habitat will enhance recreational opportunities and public access to the park and improve the surroundings consistent with existing master plans.

8.8.3 Erosion Protection

Historical development practices resulted in the construction of homes and businesses immediately adjacent to the river. Erosion of the banks and bottom of the river can cause damage to these homes and businesses, as well as generate excessive sediment that can smother downstream habitat and reduce the capacity of the river to carry floodflows.

8.8.4 Fish and Wildlife Habitat

The project will be designed to avoid or replace fish and wildlife habitats, in accordance with Federal, State, and local regulations and policy. The stream and associated riparian habitat support both year-round residents and migratory species.

Close coordination with USFWS and NMFS has been continued to fulfill requirements of the Fish and Wildlife Coordination Act and Endangered Species Act. Substantial comprehensive fish and wildlife mitigation is included in the project. Documentation of mitigation is included in appropriate sections of the Report. The letter from USFWS dated 23 February 2000 (Appendix 2) summarizes coordination results and notes their agreement on the principal elements of the mitigation plan. For Endangered Species Act requirements, informal consultation with USFWS indicates that the project is not likely to affect four listed species of concern. Formal consultation of project effects on threatened steelhead and candidate chinook salmon has been requested of NMFS and their Biological Opinion will be included in the Final Report along with the Corps' response.

8.9 Implementation

8.9.1 Federal and Non-Federal Responsibilities

8.9.1.1 Federal Responsibilities

The Corps will accomplish preconstruction engineering and design studies. After the Modified Project is approved and a cash contribution, lands, relocations, and assurances are provided by the SCVWD, the Corps will construct the project.

8.9.1.2 Non-Federal Responsibilities

SCVWD will be responsible to:

1. Provide a minimum of 25 percent, but not to exceed 50 percent, of total project costs assigned to structural flood protection, as specified below:

   - Enter into an agreement which provides, prior to construction, 25 percent of preconstruction engineering and design (PED) costs;
   - Provide, during construction, any additional funds needed to cover the non-Federal share of PED costs;
   - Provide, during construction, a cash contribution equal to 5 percent of total NED project costs;
   - Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations, except railroads, determined by the Government to be necessary for the construction, operation, and maintenance of the project;
   - Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and
   - Provide, during construction, any additional costs as necessary to make its total contribution equal to at least 35 percent of total project costs.

2. Provide 50 percent of the costs allocated to recreation, as specified below:

   - Enter into an agreement which provides, prior to construction, 25 percent of PED costs;
   - Provide, during construction, any additional funds needed to cover the non-Federal share of PED costs;
   - Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;
   - Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and
   - Provide, during construction, any additional costs as necessary to make its total contribution equal to 50 percent of total project costs.

3. Provide and maintain necessary access roads, parking areas, and other public use facilities open and available to all on equal terms.

4. For as long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government.

5. Grant the Government a right to enter, at reasonable times and in a reasonable manner, upon land that the local partner owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

6. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating the project or completed functional portions of the project, including mitigation features, without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto. Operations and maintenance will include protecting the channels and other flood protection works from future encroachment or obstruction, including sedimentation and vegetation, that would reduce their flood-carrying capacity or adversely affect the proper functioning or efficient operation and maintenance of the project works. Monitor the status of completed mitigation and provide periodic reports on its condition, and provide repairs and replacement if needed, pursuant to the MMP (Volume 2, Appendix 3).

7. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project, or separable element thereof until the non-Federal partner has entered into a written agreement to furnish its required cooperation for the project or separable element.

8. Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

9. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

10. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way necessary for the construction, operation, and maintenance of the project, except that the non-Federal partner shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

11. Assume complete financial responsibility for all necessary cleanup and response costs for any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

12. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

13. Prevent future encroachments on project lands, easements, and rights-of-way that might interfere with the proper functioning of the project. Assure that construction and maintenance of any non-Federal flood protection features do not diminish the flood protection provided by the authorized project plan.

14. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646), as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

15. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S. C. 701b-12), requiring non-Federal preparation and implementation of floodplain management plans.

16. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to the project that are in excess of 1 percent of the total amount authorized.

17. Participate in and comply with applicable Federal floodplain management and flood insurance programs and comply with the requirements in Section 402 of the Water Resources Development Act of 1986, as amended by Section 202(c) of the Water Resources Development Act of 1996.

    - Publicize floodplain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project.
    - Monitor city and county adherence to drainage master plans and performance and operations of detention basins or other facilities built to manage flows.

18. The non-Federal partner shall not use Federal funds to meet the non-Federal partner's share of total project costs under this agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

8.9.2 Need to Amend Local Cooperation Agreements (LCA)

Section 221 of the Flood Control Act of 1970 (Public Law 91-611), as amended, provides that the construction of any water resources project by the Secretary of the Army shall not be commenced until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the Project. LCAs are legally binding agreements that set forth the terms of the relationship between the Federal Government and the local partners. An LCA is required for all authorized new construction projects and must be executed between the local partners and the office of the Assistant Secretary of the Army (Civil Works) prior to advertisement of the initial construction contract for the project. Separate LCAs were executed for flood protection and recreation with SCVWD on 30 March 1992.

SCVWD, by letter dated 13 November 1991, reaffirmed its intent to participate as the non-Federal partner in implementing the flood protection improvements of the Guadalupe River project. In March 1992, while negotiating the LCA, SCVWD also agreed to participate as the non-Federal partner for the recreational development of the project.

The Federal Government and non-Federal partners will execute an amendment to the LCA for the recommended modifications to the Authorized Project. This amendment will refine the cost sharing responsibilities of the non-Federal partners for the Modified Project, such as the LPP incremental cost, Section 215 credit, betterments, and construction and operation of remaining project components, including environmental and cultural resources mitigation.

8.9.3 Credit Provisions

SCVWD is planning to implement some of the proposed mitigation actions earlier than scheduled Corps action on the modified plan. As provided in Section 215 of Public Law 90-483, as amended, SCVWD applied for a $4.09 million credit against its share of the design and construction cost of the project for work to date consistent with the authorized plan (Appendix 2).

Section 104 Credit of $5.70 million has been received by SCVWD under earlier authorized project construction. No additional Section 104 credits are being sought as part of the modified plan. The application for Section 215 credits is being processed and will be executed by ASA (CW) and the General Manager of SCVWD. In accordance with Corps policy, OMB and Congress have been notified.

8.9.4 Cost Apportionment

Based on current laws and regulations, Corps participation is limited to the Federal share of the cost of the NED plan. Accordingly, Table 8.9-1 shows the estimated Federal and non-Federal costs for the selected plan, including non-Federal betterments, and Table 8.9-2 shows the estimated Federal and non-Federal costs for the modified NED Plan. As shown on these tables, the total Federal share of the costs for the selected plan ($128.7 million) does not exceed the total Federal share of the costs for the modified NED Plan ($128.7 million). The total estimated cost for the selected plan is $226.8 million, with a Federal combined share for flood protection and recreation of $128.7 million; and the SCVWD share is $98.1 million.

The cost apportionment for the Authorized Project was 46 percent Federal and 54 percent non-Federal, including non-Federal responsibility for recreational betterments. The cost apportionment for the Recommended Plan is given in Table 8.9-1 and the cost apportionment for the remaining cost is given in Table 8.9-3.

TABLE 8.9-1. Cost Apportionment [a] for Recommended Plan

		Flood Damage Reduction ($1,000)		Recreation ($1,000)	
No.	**Item**	**Federal**	**Non-Federal**	**Federal**	**Non-Federal**
01	Lands and Damages	$6,146	$25,020	$0	$0
	Lands and Damages	*$445*	*$30,319*	*$0*	*$0*
	Section 104 Credit [b]	*$5,701*	*($5,701)*	*$0*	*$0*
	LEERD	*$0*	*$402*	*$0*	*$0*
02	Relocations	$9,737	$41,013	$0	$0
06	Fish and Wildlife Facilities	$13,919	$0	$0	$0
	Fish and Wildlife Facilities	*$9,493*	*$4,426*	*$0*	*$0*
	Section 215 Credit [d]	*$4,426*	*($4,426)*	*$0*	*$0*
09	Channels and Canals	$65,252	$5,299	$0	$0
14	Recreation Facilities	$0	$0	$945	$0
15	Floodway Control and Diversion Structures	$5,602	$0	$0	$0
18	Cultural Resources Preservation	$651	$0	$0	$0
30	Planning, Engineering, and Design	$32,834	$11,924	$59	$0
31	Construction Management	$6,959	$1,338	$102	$0
Subtotal		**$141,100**	**$84,594**	**$1,106**	**$0**
Non-Federal Cash Contribution [e]		($11,125)	$11,125	($553)	$553
Incremental Cost [f]		($1,828)	$1,828	$0	$0
Total Federal/Non-Federal Costs		***$128,147***	***$97,547***	***$553***	***$553***
Cost Apportionment (%)		**57%**	**43%**	**50%**	**50%**

[a] Fully Funded, October 2000 Price Level.
[b] Non-Federal Section 104 credit represents credit for LEERD,$402, and Channels and Canals, $5299, for a total of $5701.
[c] Cost for replacement of UPRR #4 Bridge included as a contingency in Federal Item 02
[d] Awaiting ASA(CW) approval
[e] Non-Federal cash contribution is 5% of NED cost for every account, per WRDA 1986, except 14, Recreation, which is 50% and 18 Cultural Resources which is 0%. Cash contribution for relocations requested by the partner to be included in the Corps construction contract is 100%.
[f] This is the cost difference between the NED plan and the LPP. The sponsor is responsible for 100% of the costs greater than the NED plan. With the proposed project modifications, the NED plan is now the same as the LPP, so there is no difference in cost for the remaining work.

TABLE 8.9-2. Cost Apportionment [a] for NED Plan

No.	Item	Flood Damage Reduction ($1,000)		Recreation ($1,000)	
		Federal	**Non-Federal**	**Federal**	**Non-Federal**
01	Lands and Damages	$6,024	$23,948	$0	$0
02	Relocations	$9,737	$41,013	$0	$0
06	Fish and Wildlife Facilities	$13,919	$0	$0	$0
09	Channels and Canals	$63,777	$5,299	$0	$0
14	Recreation Facilities	$0	$0	$945	$0
15	Floodway Control and Diversion Structures	$5,602	$0	$0	$0
18	Cultural Resources Preservation	$651	$0	$0	$0
30	Planning, Engineering, and Design	$32,613	$11,924	$59	$0
31	Construction Management	$6,949	$1,338	$102	$0
Subtotal		**$141,101**	**$83,522**	**$1,106**	**$0**
Non-Federal Cash Contribution [b]		($11,125)	$11,125	($553)	$553
Total Federal/Non-Federal Costs		***$128,147***	***$94,647***	***$553***	***$553***
Cost Apportionment (%)		**57%**	**43%**	**50%**	**50%**

[a] Fully Funded, October 2000 Price Level.
[b] Non-Federal cash contribution is 5% of NED cost for every account, per WRDA 1986, except 14, Recreation, which is 50% and 18 Cultural Resources which is 0%. Cash contribution for relocations requested by the partner to be included in the Corps construction contract is 100%.

TABLE 8.9-3. Cost Apportionment [a] for Remaining Cost

		Total Cost ($1,000)		Sunk Cost ($1,000)		Remaining Cost ($1,000)	
No.	**Item**	**Federal**	**Non-Federal**	**Federal**	**Non-Federal**	**Federal**	**Non-Federal**
01	Lands and Damages	$6,146	$25,020	$5,979	$1,143	$167	$23,877
	Lands and Damages	*$445*	*$30,319*	*$278*	*$6,442*	*$167*	*$23,877*
	Section 104 Credit b	*$5,701*	*($5,701)*	*$5,701*	*($5,701)*	*$0*	*$0*
	LEERD	*$0*	*$402*	*$0*	*$402*	*$0*	*$0*
02	Relocations [c]	$9,737	$41,013	$26	$18,902	$9,711	$22,111
06	Fish and Wildlife Facilities	$13,919	$0	$1,718	$0	$12,201	$0
	Fish and Wildlife Facilities	*$9,493*	*$4,426*	*$1,718*	*$0*	*$7,775*	*$4,426*
	Section 215 Credit d	*$4,426*	*($4,426)*	*$0*	*$0*	*$4,426*	*($4,426)*
09	Channels and Canals	$65,252	$5,299	$8,568	$5,299	$56,684	$0
14	Recreation Facilities	$945	$0	$407	$0	$538	$0
15	Floodway Control and Diversion Structures	$5,602	$0	$0	$0	$5,602	$0
18	Cultural Resources Preservation	$651	$0	$324	$0	$327	$0
30	Planning, Engineering, and Design	$32,893	$11,924	$24,251	$6,129	$8,642	$5,795
31	Construction Management	$7,061	$1,338	$1,070	$1,338	$5,991	$0
Subtotal		**$142,206**	**$84,594**	**$42,343**	**$32,811**	**$99,863**	**$51,783**
Non-Federal Cash Contribution [e]		($11,678)	$11,678	($6,500)	$6,500	($5,178)	$5,178
	Flood Control	($11,125)	$11,125	($6,038)	$5,905	($5,087)	$5,220
	Recreation (Incl. E&D/S&A)	($553)	$553	($462)	$595	($91)	($42)
Federal Reimbursement [f]		$0	$0	$3,150	($3,150)	($3,150)	$3,150
Incremental Cost [g]		($1,828)	$1,828	($2,906)	$2,906	$1,078	($1,078)
Total Federal/Non-Federal Costs		**$128,700**	**$98,100**	**$36,087**	**$39,067**	**$92,613**	**$59,033**
Cost Apportionment (%)		**57%**	**43%**	**48%**	**52%**	**61%**	**39%**

[a] Fully Funded, October 2000 Price Level.
[b] Non-Federal Section 104 credit represents credit for LEERD,$402, and Channels and Canals, $5299, for a total of $5701.
[c] Cost for replacement of UPRR #4 Bridge included as a contingency in Federal Item 02
[d] Awaiting ASA(CW) approval
[e] Non-Federal cash contribution is 5% for every account, per WRDA 1986, except 14, Recreation which is 50% and 18 Cultural Resources which is 0%. Cash contribution for relocations requested by the partner to be included in the Corps construction contract is 100%.
[f] This was originally a reimbursement back to the sponsor when their non-Federal costs exceeded 50%. Based on the new cost estimate, the Federal costs will clearly exceed the non-Federal costs and, consequently, the sponsor will be paying back this reimbursement.
[g] This is the cost difference between the NED plan and the LPP. The sponsor is responsible for 100% of the costs greater than the NED plan. With the proposed project modifications, the NED plan is now the same as the LPP, so there is no difference in cost for the remaining work. Due to a shift in cost between the LPP and NED projects, payment may be required to the sponsor.

8.9.5 Modified Project Implementation Schedule

Construction of the remaining portions of the project will consist of two general construction contracts and four design/construct mitigation contracts.

Construction of Segment 3C Phase 3 includes the construction of flood protection and recreation improvements from Woz Way (station 189+85) to Grant Street (station 200+80) located immediately upstream from I-280. It is estimated that construction will be completed in two construction seasons. Segments 3A and 3B include the construction of flood protection and recreation improvements between Park Avenue (station 171+ 40) and Coleman Avenue (station 119+23). It is also estimated that construction of Segments 3A and 3B will be completed in two construction seasons.

The first mitigation contract will establish plant material within Segments 1, 2, and 3. The second mitigation contract will establish plant material within the Reach A mitigation site, immediately downstream from I-880. The SCVWD will be responsible for two additional mitigation contracts that will implement plant material on Guadalupe Creek upstream from I-280 and within the river between Woz Way and San Carlos Street. The collection and propagation of plant material will be accomplished in the fall approximately 6-12 months before mitigation construction. The contracts will consist of a 3-year establishment period prior to being transferred to the SCVWD for operation and maintenance.

Table 8.9-4 contains the timing for completion of important milestones in the implementation of the Modified Project (see also Table 3.4-7).

TABLE 8.9-4. Implementation Schedule

Item	Completion Date
Plans and Specifications	March 2001
Approval of New Construction Start	March 2001
LCA Amendments Signed	May 2001
Real Estate Acquisitions	May 2001
Advertise Construction Contract	June 2001
Completion of Construction	December 2004

8.9.6 Resolution of Threatened Legal Action

Project stakeholders signed a Dispute Resolution Memorandum in July 1998 that precluded further construction delay by preventing costly and time-consuming litigation. The DRM (Appendix 2) outlines proposed modifications to the Authorized Project that address long-term flood protection and habitat needs for a portion of the Guadalupe River. Proposed project modifications will bring the project into compliance with the CWA and the ESA.

On April 14, 1999, the Collaborative members comprised of the project stakeholders (the Corps and SCVWD , State and Federal resource agencies, and environmental groups), signed a supplement to the DRM that sets the standards for monitoring and preserving project mitigation throughout the life of the project. The Supplement confirms that

conditions have been met to develop an MMP and implementation of certain mitigation measures prior to, or concurrent with, project construction as agreed to in the DRM.

8.9.7 Views of the Non-Federal Partner

SCVWD has expressed the desire to implement the Modified Project and sponsor project construction in accordance with the items of local cooperation that are set forth in the recommendations section of this chapter. The financial analysis indicates that the non-Federal partner is financially capable of participating in the Modified Project. The Letter of Intent is in Appendix 2.

8.10 Recommendations

The following is the recommendation for approval of the Recommended Plan from the Sacramento District Engineer.

I recommend that the modified Guadalupe River Project be approved for implementation as a Federal project, with such additional modifications thereof as in the discretion of the Commander, USACE, may be advisable. The estimated remaining first cost of the Modified Project is $151.6 million and estimated annual OMRR&R cost is $2.25 million. The Federal portion of the estimated remaining first cost is $92.6 million. The non-Federal partner shall, prior to implementation, agree to perform the following items of local cooperation:

1. Provide a minimum of 25 percent, but not to exceed 50 percent, of total project costs assigned to structural flood protection, as specified below:
   - Enter into an agreement which provides, prior to construction, 25 percent of preconstruction engineering and design (PED) costs;
   - Provide, during construction, any additional funds needed to cover the non-Federal share of PED costs;
   - Provide, during construction, a cash contribution equal to 5 percent of total NED project costs;
   - Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations, except railroads, determined by the Government to be necessary for the construction, operation, and maintenance of the project;
   - Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and
   - Provide, during construction, any additional costs as necessary to make its total contribution equal to at least 35 percent of total project costs.

2. Provide 50 percent of the costs allocated to recreation, as specified below:
   - Enter into an agreement which provides, prior to construction, 25 percent of PED costs;
   - Provide, during construction, any additional funds needed to cover the non-Federal share of PED costs;

- Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;
- Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and
- Provide, during construction, any additional costs as necessary to make its total contribution equal to 50 percent of total project costs.

3. Provide and maintain necessary access roads, parking areas, and other public use facilities open and available to all on equal terms.

4. For as long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government.

5. Grant the Government a right to enter, at reasonable times and in a reasonable manner, upon land that the local partner owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

6. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating the project or completed functional portions of the project, including mitigation features, without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto. Operations and maintenance will include protecting the channels and other flood protection works from future encroachment or obstruction, including sedimentation and vegetation, that would reduce their flood-carrying capacity or adversely affect the proper functioning or efficient operation and maintenance of the project works. Monitor the status of completed mitigation and provide periodic reports on its condition, and provide repairs and replacement if needed, pursuant to the MMP (Volume 2, Appendix 3).

7. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project, or separable element thereof until the non-Federal partner has entered into a written agreement to furnish its required cooperation for the project or separable element.

8. Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

9. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

10. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way necessary for the construction, operation, and maintenance of the project, except that the non-Federal partner shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

11. Assume complete financial responsibility for all necessary cleanup and response costs for any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

12. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

13. Prevent future encroachments on project lands, easements, and rights-of-way that might interfere with the proper functioning of the project. Assure that construction and maintenance of any non-Federal flood protection features do not diminish the flood protection provided by the authorized project plan.

14. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646), as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

15. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S. C. 701b-12), requiring non-Federal preparation and implementation of floodplain management plans.

16. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to the project that are in excess of 1 percent of the total amount authorized.

17. Participate in and comply with applicable Federal floodplain management and flood insurance programs and comply with the requirements in Section 402 of the Water Resources Development Act of 1986, as amended by Section 202(c) of the Water Resources Development Act of 1996.

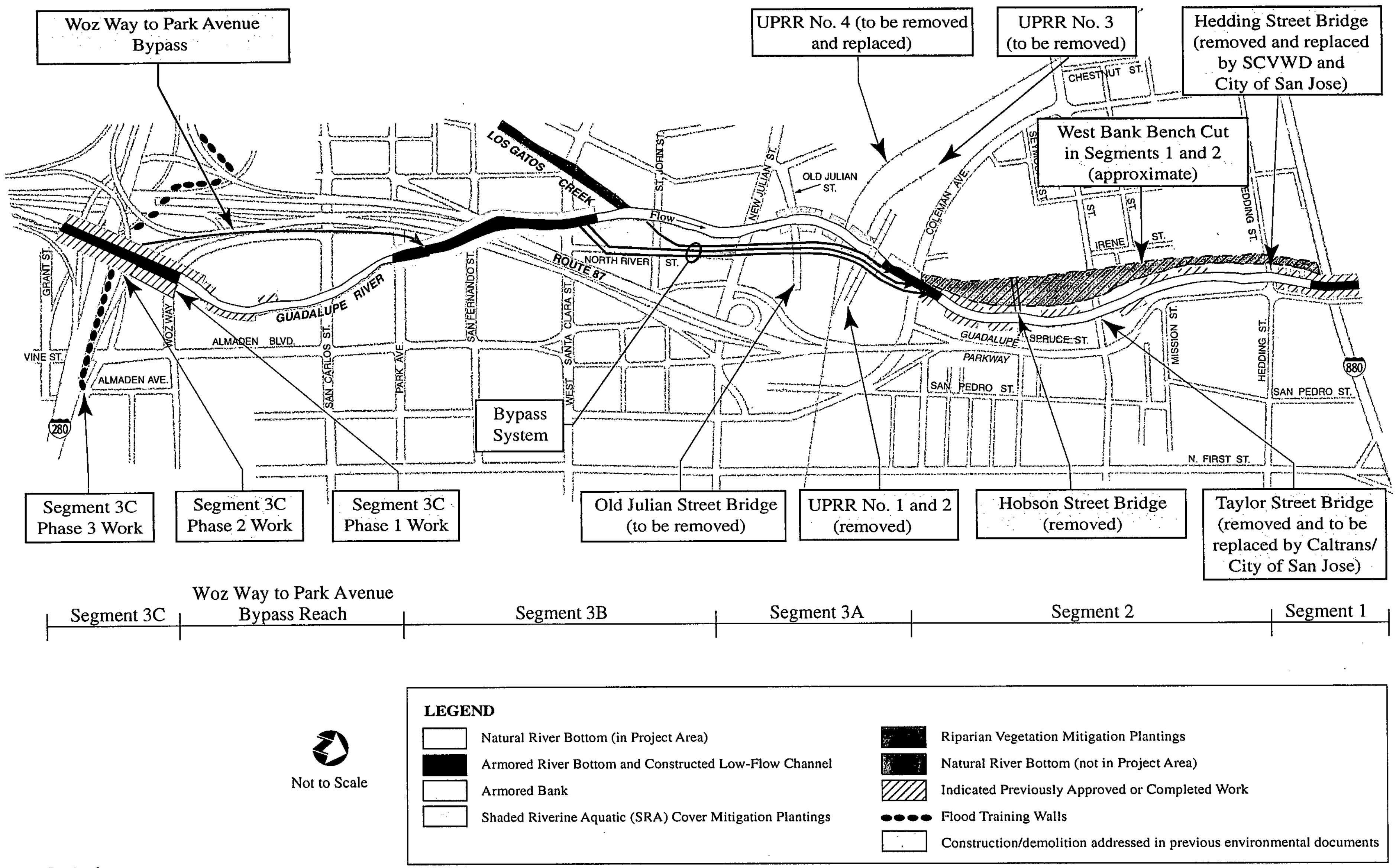
- Publicize floodplain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project.
- Monitor city and county adherence to drainage master plans and performance and operations of detention basins or other facilities built to manage flows.

18. The non-Federal partner shall not use Federal funds to meet the non-Federal partner's share of total project costs under this agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

Sacramento District has carefully reviewed the authorities for approving post-authorization changes presented in ER 1105-2-100, Planning Guidance Notebook, dated 22 April 2000. This review indicates that it is within the discretionary authority of the Commander, USACE to approve the modified Guadalupe River Project. These recommended modifications are necessary to bring the project into compliance with Federal and State environmental protection statutes and policies, and will not substantially change the project's scope, location, size, outputs, or purposes from the originally authorized plan. The Energy and Water Development Appropriations Act of 1990 exempted the project from the cost increase limitation in Section 902 of the Water Resources Development act of 1986. There would be no changed features or conditions resulting from the project modifications that require Congressional authorization.

The Recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program or the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are approved. However, prior to approval, the partner, the State, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

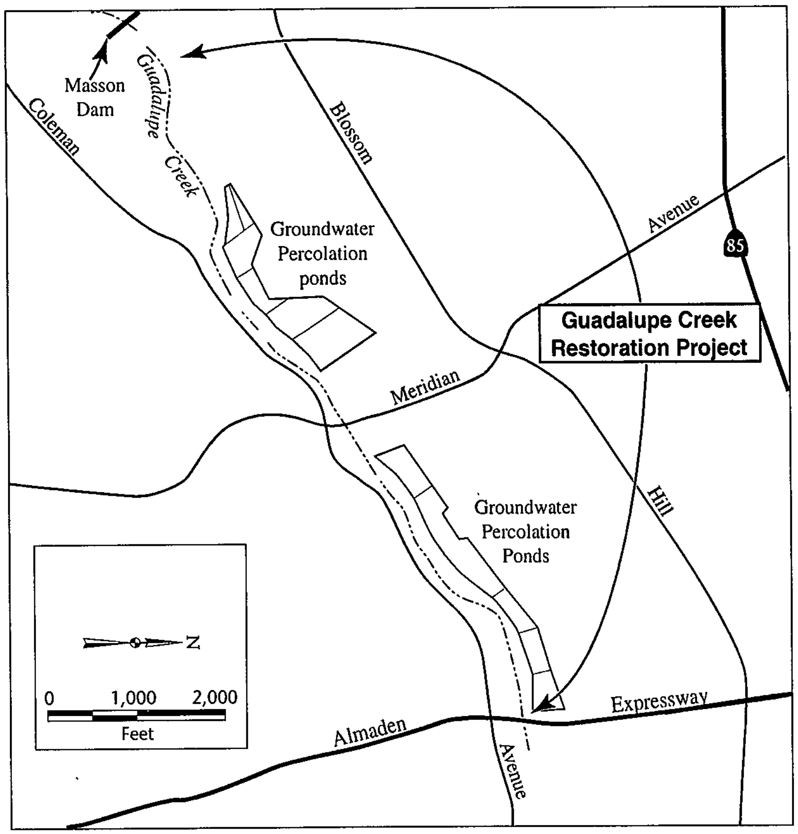
Michael J. Walsh
Colonel, Corps of Engineers
District Engineer



Revised

Figure 8.2-1. Guadalupe River Project with Refined Bypass System Alternative (Proposed Action)
Flood Protection and Onsite Mitigation Components

Guadalupe Creek Mitigation Site*



*This figure depicts the entire Guadalupe Creek Restoration Project area. A portion of this area will be used to mitigate for the Guadalupe River Project with Proposed Action.

Reach A Mitigation Site

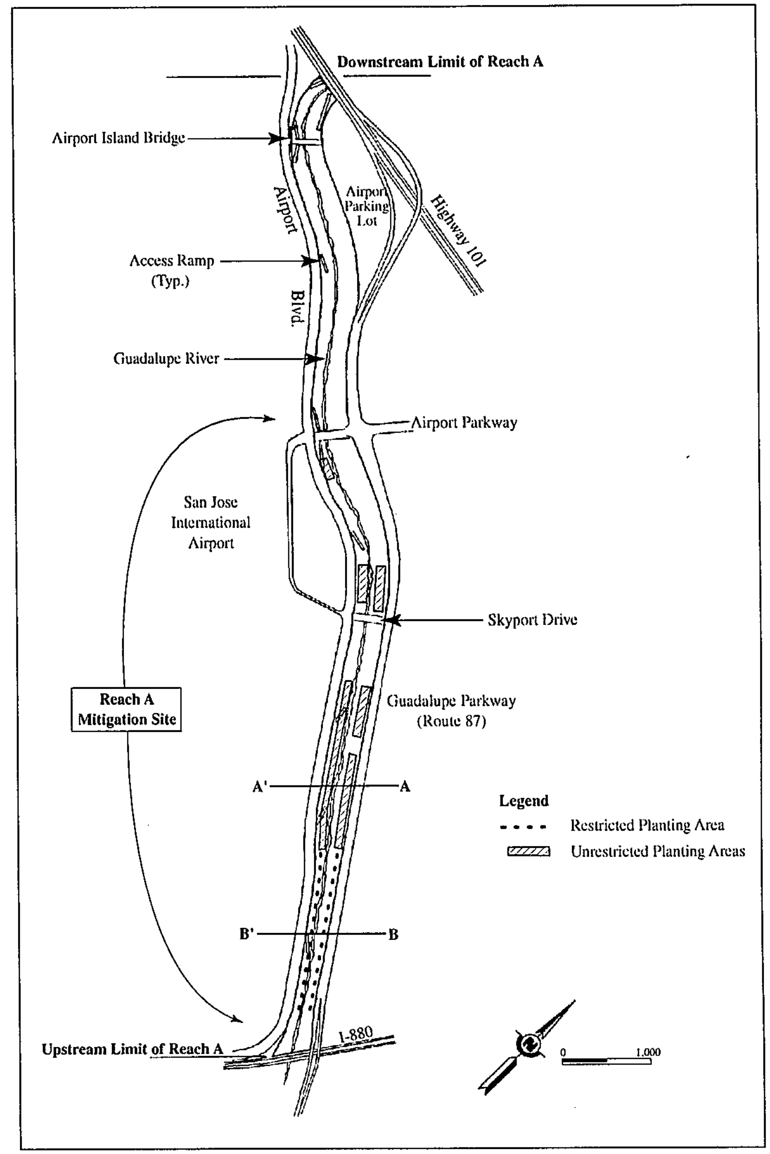
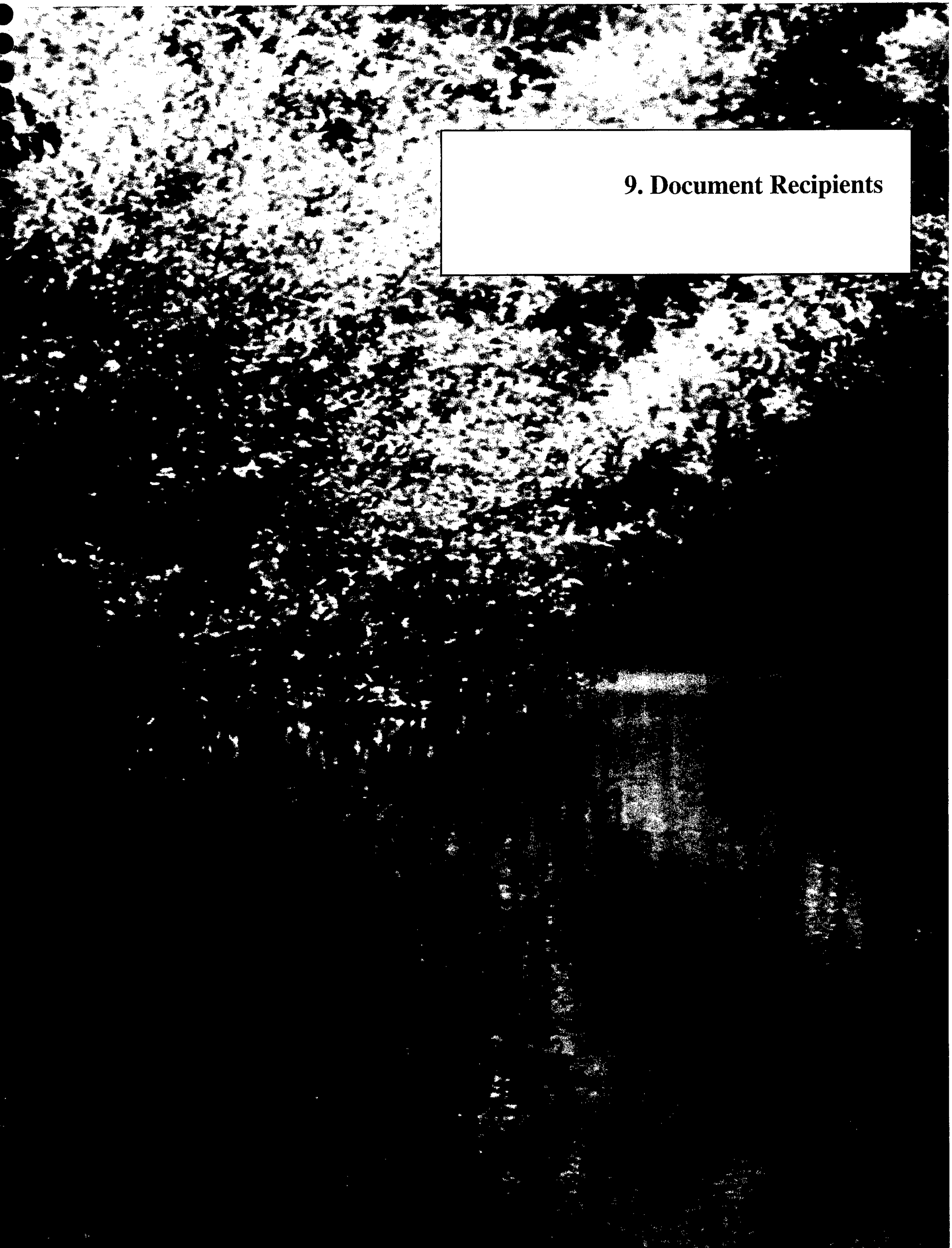


Figure 8.2-2. Offsite Mitigation Areas

9. Document Recipients



CHAPTER 9

Document Recipients

9.1 Agencies and Officials

California Department of Fish and Game
Attn: Carl Wilcox, Environmental Services Supervisor
7329 Silverado Trail
Yountville, CA 94599

National Marine Fisheries Service
Attn: Mark Helvey, Fishery Biologist
501 West Ocean Blvd, Suite 4300
Long Beach, CA 90802

San Francisco Bay Regional Water Quality Control Board
Attn: Dale Bowyer, Chief, Watershed Management
1515 Clay Street, Suite 1400
Oakland, CA 94612

San Francisco Bay Regional Water Quality Control Board
Attn: Bruce Wolfe, Chief, Watershed Protection division
1515 Clay Street, Suite 1400
San Francisco, CA 94612

San Francisco Bay Regional Water Quality Control Board
Attn: Khalil Abu-Saba, Environmental Specialist
1515 Clay Street, Suite 1400
Oakland, CA 94612

San Francisco Bay Regional Water Quality Control Board
Attn: Richard Mc Murtry, Biologist
c/o State Permit Assistance Center
70 West Hedding, 6th Floor
San Jose , CA 95110-1075

Bay Area Air Quality Management District
Attn: Jean Roggenkamp, Planning Division
939 Ellis Street
San Francisco, CA 94109-7799

City of San Jose
Attn: Darrell Dearborn, Senior Deputy City Manager
801 No. First Street, Room 436
San Jose, CA 95112-5111

City of San Jose
Attn: Cindy Chavez, Council Member
801 No. First Street
San Jose, CA 95112-5111

City of San Jose Department of Public Works
Attn: Rajeev Batra, Director
801 No. First Street, Room 320
San Jose, CA 95110

City of San Jose Department of Public Works
Attn: Taher Basma, Senior Civil Engineer
801 No. First Street, Room 300
San Jose, CA 95110

City of San Jose Planning Department
Attn: Jim Derryverry, Director of Planning
801 North First Street, Room 400
San Jose, CA 95110

City of San Jose, Department of Planning, Building and Code Enforcement
Attn: Janis Moore, Planner II
801 North First Street,
San Jose, CA 95110-1795

City of San Jose Department of Recreation and Parks
Attn: Steve Roemer, Maintenance Supervisor
801 North First Street
San Jose, CA 95110

City of San Jose Redevelopment Agency
Attn: Dennis Korabiak, Downtown Coordinator
50 West San Fernando Street, Suite 1100
San Jose, CA 95113-2415

City of San Jose Redevelopment Agency
Attn: Frank Fiscalini, Chair, Guadalupe River Park Task Force
50 West San Fernando Street, Suite 1100
San Jose, CA 95113-2415

City of San Jose Redevelopment Agency, Permitting Division
Attn: Jason Burton,
50 West San Fernando Street, Suite 1100
San Jose, CA 95113-2415

Santa Clara County Board of Supervisors
Attn: Don Gage, Chairman
Office of the Board of Supervisors
70 West Hedding Street, 18th Floor
San Jose, CA 95110

Santa Clara Valley Water District
Attn: Stan Williams, General Manager
5750 Almaden Expressway
San Jose, CA 95118

Santa Clara Valley Water District
Attn: Walter Wadlow, Chief Operating Officer
5760 Almaden Expressway,
San Jose, CA 95118

Santa Clara Valley Water District
Attn: Nai Hsueh, Deputy Operating Officer, Capitol Program Services
5760 Almaden Expressway,
San Jose, CA 95118

Santa Clara Valley Water District
Attn: Jim Fiedler, Deputy Operating Officer, Watershed Management
5760 Almaden Expressway,
San Jose, CA 95118

Santa Clara Valley Water District
Attn: Bob Teeter, District Library
1020 Blossom Hill Road,
San Jose, CA 95123

Santa Clara Valley Water District, Guadalupe River Watershed Offices
Attn: Paula Sparkman, Assistant, Guadalupe River Watershed
5760 Almaden Expressway,
San Jose, CA 95118

Santa Clara Valley Water District
Attn: Dennis Cheong, Seniior Project Manager, Lower Guadalupe Project
5760 Almaden Expressway,
San Jose, CA 95118

Santa Clara Valley Water District
Attn: Dave Chesterman, Manager, Guadalupe River Watershed
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All individuals on the Guadalupe River Project mailing list will be notified of the availability of this Report.

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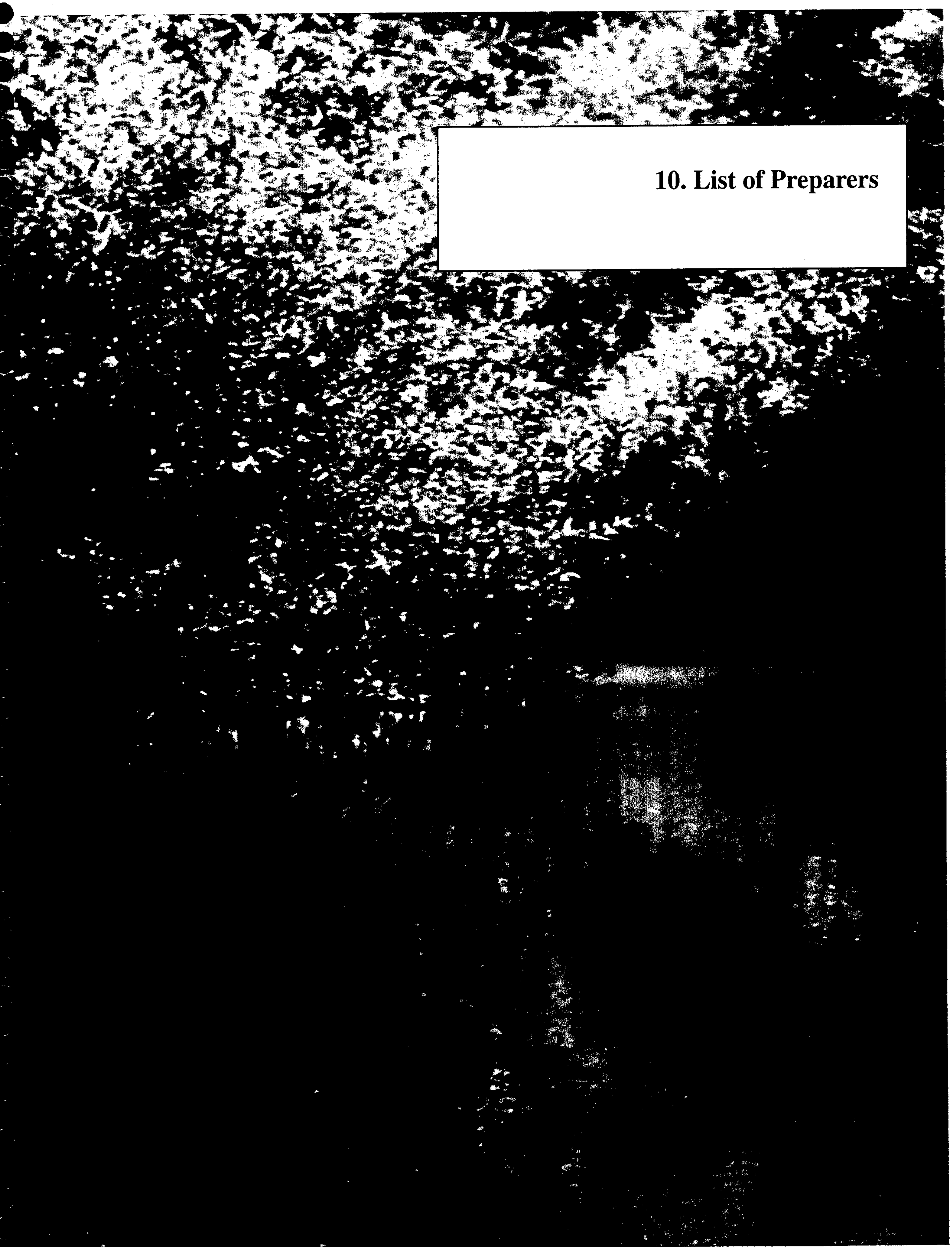

CHAPTER 10

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The following is a list of persons who contributed to preparation of the EIR/SEIS:

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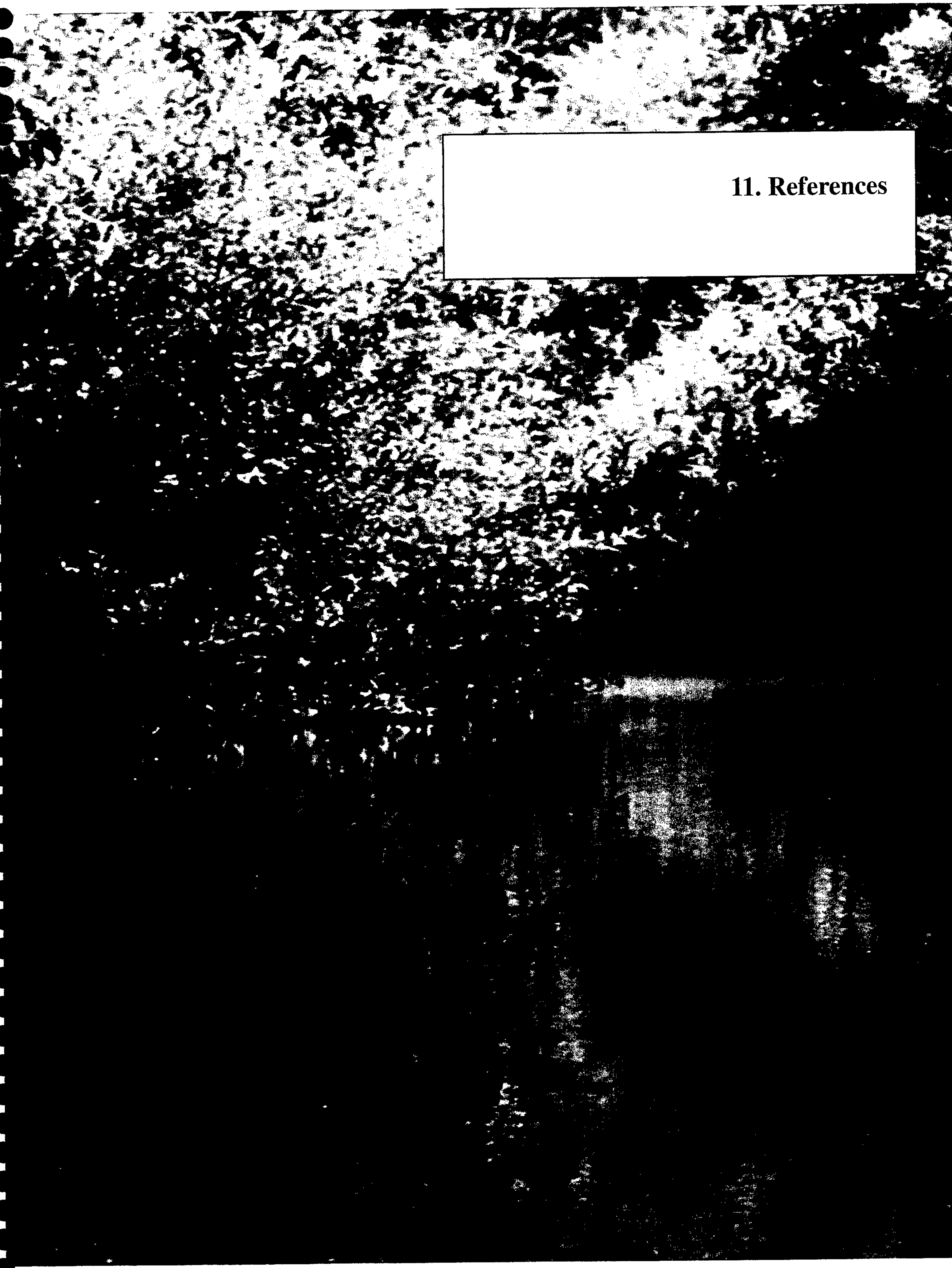

CHAPTER 11

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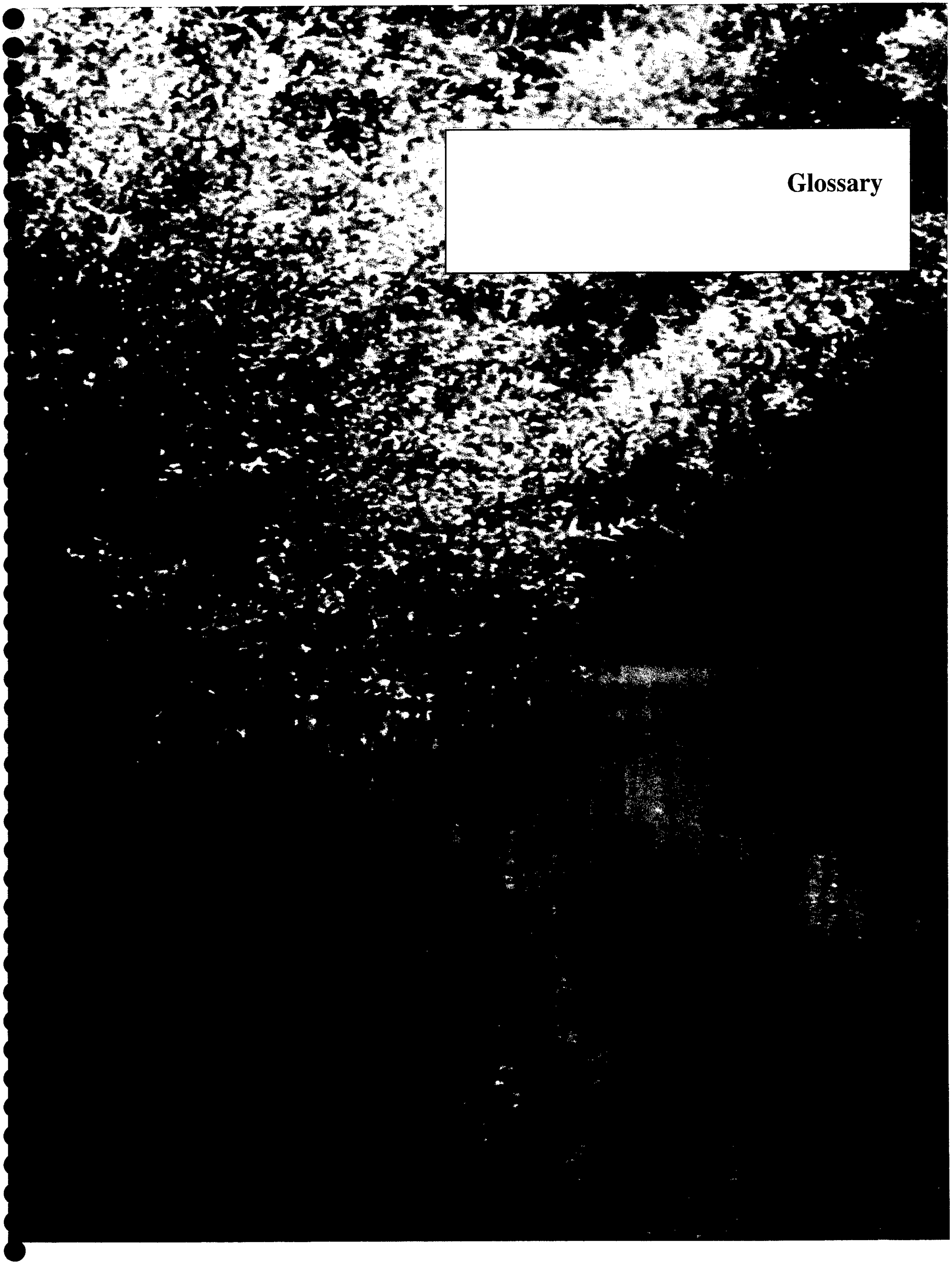
Glossary



Glossary

adaptive management Adjusting project strategy as needed to achieve mitigation objectives while the project is being implemented.

adverse impacts Unfavorable, harmful, or detrimental changes in environmental conditions caused by project or municipal activities.

aggradation 1) The buildup of sediment at the headwaters of a lack or reservoir or at a point where streamflow slows to the point that it will drop part or all of its sediment load. 2) Modification of the earth's surface in the direction of uniformity of grade or slope, by deposition, as in a river bed.

alluvial deposits Relating to material, sands and gravels, deposited by flowing water. Sedimentary formation composed of clay, sand, gravel, and other materials moved and deposited by streams and deposited by them.

ambient 1) The existing or background air, soil, water, or plant quality in a given community. 2) The allowable amount of materials, as a concentration of pollutants, in air, soil, water, or plants.

anadromous fish Fishes, such as salmon, steelhead, and shad, that inhabit marine waters during juvenile and adult life stages and migrate to fresh water to spawn.

armored; armoring A facing layer or protective cover of concrete structural features placed to prevent erosion or the sloughing off of an embankment. Also, a layer or large stones, broken rocks or boulders, or precast blocks placed in specific random fashion on a river to protection against flowing water.

Authorized Project The flood protection measures for downtown San Jose, entitled the Guadalupe River Project, authorized by Congress under Section 401(b) of the Water Resources Development Act of 1986.

basal area The area occupied by the base of a tree.

baseline condition The ambient environmental condition existing in the absence of project development. "Future baseline" is a description of conditions that could occur in the future assuming no project development.

bed The bottom of a body of water, such as a stream.

bench cut areas Land cut into terraces for the purpose of riparian zone restoration or to strengthen the design of a water channel.

berm 1) A narrow ledge or path as the top or bottom of a slope, stream bank, or along a beach. 2) (Dam) A horizontal step or bench in the upstream or downstream face of an embankment dam.

Best Management Practices (BMPs) Schedules of activities, prohibition of practices, maintenance procedures, and other practices to prevent or reduce the pollution of water of the United Sates from discharges of dredged or fill material.

biological assessment A formal examination of the health of a natural community, including air, water, soil, plants, animals, and other organisms.

biostimulatory nutrients Elements such as nitrogen and phosphorus that promote plant and algae growth.

biotechnical bank stabilization areas Sections of a water channel that are strengthened through the introduction of specific plants, trees, and shrubs.

biotic resource Living organisms.

bottom-withdrawal siphon An opening at a low level from a reservoir generally used for emptying or for scouring sediment and sometimes for irrigation releases.

box culvert A water channel in the shape of a rectangular concrete box.

bypass A pipe or water channel used to conduct water around some fixture.

Bypass System Alternative Construction and operation of an underground bypass system to convey floodwaters around important riparian habitat in Segments 3A and 3B; onsite mitigation plantings in Segments 3A and 3B; expanded offsite mitigation in Reach A mitigation site and Guadalupe Creek mitigation site; riverbank and channel bed armoring including a new low-flow channel design in armored channel bed sections; invert stabilization structures; pedestrian trails/maintenance roads; and construction of flood training walls in Segment 3C Phase 3.

capping the site Constructing a concrete seal around an area to prevent disturbance by development activities.

channel A natural stream that conveys water; a ditch or channel excavated for the flow of water.

channel geometry The structure of a waterway, including the force of water currents, the height and content of banks, and other features.

check structures A small dam or levee constructed in a gully or other small watercourse to decrease the streamflow velocity, minimize channel erosion, promote deposition of sediment, and to divert water from a channel.

chinook salmon The largest species of the salmon family. Inhabits the northwest Pacific Ocean and spawns in rivers and streams of North America. The species has a number of races classified by the season in which they migrate into rivers to spawn (i.e., winter run, spring run, fall run, and late-fall run known to occur in California.).

Clean Water Act Formally known as the Federal Water Pollution Control Act, it constitutes the basic water pollution control statute for the United States.

cofferdams Temporary structures used to allow construction in water by isolating an area so it can be pumped dry.

coliform bacteria A group of organisms usually found in the colons of animals and humans. The presence of coliform bacteria in water is an indicator of possible pollution by fecal material. Generally reported as colonies per 100 milliliters (ml) of sample.

concrete cellular mattress (CCM) Concrete blocks with metal cable ties that are laid in an interlocking pattern. Typically 6 inches thick.

confluence The act of flowing together; the meeting or junction of two or more streams; also, the place where these streams meet.

cribwalls A barrier constructed of timber forming bays, boxes, cribs, crossed timbers, gabions, or cells that are filled with earth, stone, or heavy material.

cubic feet per second (cfs) A measure of a moving volume of water, sometimes shortened to "second-feet."

cultural resources Any building, site, district, structure, object, data, or other material significant in history, architecture, archaeology, or culture.

cumulative impact Two or more individual effects that, when considered together, are considerable or that compound or increase other environmental effects. The individual impacts may be changes resulting from a single project or a number of separate projects.

debris loading The amount of material carried in a stream.

degradation The general lowering of the streambed by erosive processes, such as scouring by flowing water. The removal of channel bed materials and downcutting of natural stream channels. Such erosion may initiate degradation of tributary channels, causing damage similar to that due to gully erosion and valley trenching.

design flood The flood magnitude selected for use as a criterion in designing flood control works. The largest flood that a given project is designed to pass safely. In dam design and construction, the reservoir inflow-outflow hydrograph used to estimate the spillway discharge capacity requirements and corresponding maximum surcharge elevation in the reservoir.

dissolved oxygen (DO) Oxygen dissolved in water that is available to supply oxidation and respiration requirements.

downcutting The erosive effect of water against the river channel; incision.

downtown reach The 2.6-mile long area along the Guadalupe River between Grant Street and I-880 and Grant Street in downtown San Jose.

drop structure A structure for dropping water to a lower level and dissipating its surplus energy. A drop may be vertical or inclined.

earthen channel A waterway lined with dirt and rock.

ecosystem A recognizable, relatively homogeneous unit that includes organisms, their environment, and all the interactions among them

endangered or threatened species A species or subspecies of plant or animal whose prospects of survival and reproduction are in immediate jeopardy throughout all or a significant portion of its range.

Endangered Species Act of 1973 (ESA) Federal law that provides protections to plant and animal species that are determined to be in danger of extinction.

Environmental Assessment (EA) A concise public document that analyzes the environmental impacts of a proposed Federal action and provides sufficient evidence to determine the level of significance of the impacts.

Environmental Impact Statement (EIS) A detailed written statement, required by Section 102(2)(c) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance of long-term productivity, and any irreversible and irretrievable commitment of resources.

Environmental Impact Report (EIR) A detailed written statement, required by California Environmental Quality Act, similar to the EIS described above.

erosion The wearing away of land surface by running water including rainfall, waves and currents, glacier ice, or wind.

estuarine Pertaining to an estuary; a water passage where ocean water mixes with river water.

feasible control measures (1-6) Plans that can successfully be accomplished by reasonably available means, in this case regarding removal of soil without increasing water turbidity.

federally authorized Actions that conform to Federal standards and codes, or that are initiated by Federal legislation.

Finding of No Significant Impact (FONSI) A public document that briefly presents the reasons why an action will not have a significant impact on the human environment, and therefore, will not require the preparation of an environmental impact statement.

fish passage facilities Structures intended to allow or enhance the movement of anadromous fish in their upstream and downstream migrations past dams and other barriers; includes fish ladders, bypass pipelines, and associated structures.

flood bypass system A series of pipelines, canals, and causeways intended to divert flood waters away from valuable resources.

flood training walls A berm, concrete wall, or other elongated retaining structure placed at an angle above a downstream site or structures in order to reduce impact forces and deflect water and debris transported by debris torrents and floods.

floodway The channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

fluvial Of or pertaining to rivers.

fry (fisheries) An early life stage of anadromous species comprising newly hatched fish less that 50 millimeters long that begin a distinct downstream movement toward the ocean.

gabions A wire cage, usually rectangular, filled with cobbles and used as a component for water control structures or for channel and bank protection.

gaging weir A particular structure on a stream, canal, lake, or reservoir where systematic observations of gage height or discharge are obtained.

geomorphic; geomorphology That branch of geology that deals with the composition and structure of the earth's surface.

gradient control structures Structures such as weirs and dams that alter the slope of a waterway as it descends.

gross pool The total capacity of a pool in a streambed.

groundwater Any subsurface water from which wells are supplied. Underground water and groundwater are synonymous.

Guadalupe Creek Mitigation Site A potential offsite SRA mitigation area approved by USFWS and NMFS; a portion of the Guadalupe Creek Restoration Project between Masson Dam and Almaden Expressway.

Guadalupe Creek Restoration Project An independent restoration project occurring along Guadalupe Creek between Masson dam and Almaden Expressway that will include SRA cover vegetation mitigation, biotechnical bank stabilization, upland restoration, riparian restoration, channel realignment, and fish habitat.

Guadalupe River Project with Proposed Action Construction of the Proposed Action and the operation and maintenance of the entire Guadalupe River Project, including all of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass.

Guadalupe River Project with Refined Bypass System Alternative Construction of the Refined Bypass System Alternative and the operation and maintenance of the entire Guadalupe River Project, including all of Segments 1, 2, and 3 and the Woz Way to Park Avenue bypass.

Guadalupe River Project Generally defined as the flood protection project in downtown San Jose along the Guadalupe River between I-880 and Grant Street.

habitat The place where an animal or plant normally lives, among its associated species and support systems, often characterized by a dominant plant and codominant form, such as pinyon-juniper habitat.

habitat degradation The destruction of natural elements necessary to support native species.

habitat evaluation procedure (HEP) A method for analyzing impacts on wildlife resources that models the preproject and postproject quality and quantity of habitats for a set of species selected to represent all wildlife.

habitat fragmentation Separating critical natural features from each other such that they become less useful to the animals or plants that occupy them.

hardscaping features Rocks, boulders, armoring, and weirs that are part of the natural and design flow of a waterway.

hazardous materials Raw materials and products that, because of their quantity, concentration, or physical or chemical characteristics, pose a significant present or potential danger to human health and safety or to the environment if released.

heat transfer Any device designed to transfer heat from one medium to another, often employing water as an agent.

HEC-6 sediment study A sophisticated movable bed sediment transport study using the U.S. Army Corps of Engineers – Hydraulic Engineering Center's HEC-6 " Scour and Deposition in Rivers and Reservoirs" numerical model. The HEC-6 sediment model estimates erosion and deposition based on the hydraulic characteristics at numerous cross sections within each river reach. The HEC-6 sediment study also considers the depth and texture of the channel bed and bank materials as well as underlying resistant layers that would limit erosion when calculating channel bed scour.

hydraulics Study of the practical effects and control of moving water; used to refer to the relationship between channel geometry and flow, velocity, and depth of water.

hydrograph A graphic representation or plot of changes in the flow of water or in the elevation of water level plotted against time. A graph showing stage, flow, velocity, or other hydraulic properties of water with respect to time for a particular point on a stream. Hydrographs of wells show the changes in water levels during the period of observation.

incision The process by which water cuts a channel or erodes a bank.

invert River bottom.

invert stabilization structures Small weirs placed in the natural river channel to reduce the river grade, trap sediments, and create gravel bars and other in-channel habitat.

invertebrates Organisms that lack a spinal column; includes mollusks, crustaceans, insects, starfish, jellyfish, sponges, and many types of worms.

jurisdictional wetlands Waters of the United States; waters regulated by the Clean Water Act.

larvae Plural of larva. The early form of an animal, such as a frog or insect, as it develops away from its birth form and begins to take on adult characteristics.

listed species Species, including subspecies, of fish, wildlife, or plants listed at 50 CFR Section 17.11 and Section 17.12 as either endangered or threatened or species declared threatened or endangered by the California Fish and Game Commission, including steelhead and California red-legged frog.

low-flow channel A water flow maintenance strategy that commits a minimum depth of water to a channel despite weather conditions.

maintenance flow A level of stream flow established by stream flow control devices expected to result in aquatic species survival despite seasonal fluctuations in precipitation and stream recharge.

metamorphs A marked or abrupt developmental change in an animal, as when a cocoon releases a butterfly.

mitigation To moderate, reduce, alleviate the impacts of a proposed activity; includes in order: a) avoiding the impact by not taking a certain action or parts of an action; b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; c) rectifying the impact by repairing, rehabilitating, or restoring the

affected environment; d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; e) compensating for the impact by replacing or providing substitute resources or environments.

National Environmental Policy Act (NEPA) Federal legislation that establishes environmental policy for the nation. It provides an interdisciplinary framework for Federal agencies to prevent environmental damage and contains "action-forcing" procedures to ensure that Federal agency decision-makers take environmental factors into account.

National Register of Historic Places (NRHP) A register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior.

natural community conservation plans A plan prepared pursuant to the Natural Community Conservation Planning Act (Fish and Game Code section 2800 et seq.) that identifies and provides for the regional or area-wide protection and perpetuation of natural wildlife diversity, while allowing compatible and appropriate development and growth

NCCP habitat or habitat type Broad habitat categories, each of which includes a number of habitat or vegetation types recognized in frequently used classification systems. The 18 NCCP habitats in the Multi-species Conservation Strategy include tidal perennial aquatic, Valley riverine aquatic, montane riverine aquatic, and lacustrine.

natural movement corridors Wildlife habitat areas through which species naturally migrate during periods of the day or seasons of the year.

natural recruitment The proliferation of a plant species by natural means, such as seeds being broadcast from fruit trees, or acorns from oaks.

No-Action Alternative The future without project condition. In this report the No-Action Alternative condition includes the remaining approved construction of Segment 3C Phase 2 and remaining mitigation for construction of Segments 1, 2, and 3C Phase 1 & 2. It does not include operation of Woz Way to Park Avenue bypass and does not provide improved flood protection.

noise-sensitive receptors People who work or live within hearing range of sounds produced by the project.

non-native species Wildlife species introduced to an area from somewhere else, often resulting in destructive consequences for native species.

offsite mitigation area An area away from the project site where habitat may be restored or protected as a mitigation to project impacts.

100-year flood A flood that has a 1-percent probability of occurrence in a given year.

1% flood A flood that has a 1 percent chance of being equaled or exceeded in any given year.

peak flows The maximum discharge of a stream during a specified period of time.

percolation pond A pond constructed for the purpose of returning water to an aquifer by infiltration into the soil.

photosynthesis Production of oxygen by aquatic algae and plants.

plunge pools and gravel-bar sequences Slow and fast moving sections of a waterway necessary for anadromous fish spawning.

PM10 emissions Emissions that contain suspended particulate matter 10 micrometers or larger in diameter. PM10 emissions are generated by a wide variety of sources, including agricultural activities, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

Project Area The area along the Guadalupe River between Grant Street and I-880, the area along the Guadalupe River between I-880 and Airport Parkway (Reach A mitigation site), and an area of Guadalupe Creek between Masson Dam and Almaden Expressway (Guadalupe Creek mitigation site).

Project Partners The U.S. Army Corps of Engineers, Sacramento District, and the Santa Clara Valley Water District; the agencies proposing the flood protection components described in this document.

Project Segment The Guadalupe River project has been divided into project segments, including Segment 1, 2 and 3. Segment 3 has further been subdivided into Segment 3A, B, and C.

Proposed Action See Refined Bypass System Alternative

reach A section of waterway along which a project is proposed, underway or completed.

Reach A The area along the Guadalupe River between Highway I-880 and 101.

Reach A Mitigation Site The area along the Guadalupe River between Airport Parkway and I-880.

recharge (hydrology) The introduction of surface water or groundwater to groundwater storage such as an aquifer.

reconnaissance-level analysis Drawing conclusions based on direct site observation.

records search; literature review Examining all available county and governmental records relating to the property or land feature in question in order to collect a complete history of development for the subject in question.

redd A type of fish spawning area associated with flowing water and clean gravel.

Refined Bypass System Alternative Construction and operation of an underground bypass system to convey floodwaters around important riparian habitat in Segments 3A and 3B; onsite mitigation plantings in Segments 3A and 3B; expanded offsite mitigation in Reach A mitigation site and Guadalupe Creek mitigation site; riverbank and channel bed armoring including a new low-flow channel design in armored channel bed sections; invert stabilization structures; pedestrian trails/maintenance roads; and construction of flood training walls in Segment 3C Phase 3. This alternative, unlike the Bypass System Alternative, does not include a crossing under New Julian Street Bridge or stairs on either side of the New Julian Street Bridge.

riffles Shallow rapids in an open stream where the water surface is broken into waves by obstructions such as sandbars or gravel.

riparian Pertaining to the banks of a river, stream, waterway, or other, typically, flowing body of water, as well as to plant and animal communities along such bodies of water.

riparian habitat Woody vegetation, trees, and shrubs, that grows in soils saturated for a substantial portion of the year, especially on the edges of open water bodies (e.g., lakes, rivers, or ditches) or on levees.

riprap A lightweight stone covering used to protect soil or surfaces from erosion by water or the elements.

root wads Exposed tree roots embedded trunk-first in the side of a water channel for the purpose of channeling water flow and promoting fish habitat.

ruderal vegetation A disturbed area that has been allowed to become revegetated naturally.

salmonid Any of a large family of fish similar to salmon or trout that have three vertebrae upturned.

salt ponds Areas along a bay or ocean where salt water is collected for the production of commercial salt through condensation and evaporation. Such ponds become highly toxic to wildlife.

SAM sediment study A preliminary planning level sediment transport continuity study using the U.S. Army Corps of Engineers' "Sediment Accounting Methodology" package. The SAM sediment study estimates the potential for erosion and deposition of bedload based on a simplified representation of channel hydraulics for each river reach. The SAM sediment study does not consider natural or artificial bed armoring and assumes that material can be eroded to meet the potential energy levels described by the representative hydraulic conditions.

scour The erosive action of running water in streams, carrying away material from bed and banks.

sediment balance The relative difference between erosion and deposition in any given river segment is referred to as the "sediment balance." The sediment balance reflects the net change in erosion and deposition, usually measured by numerical analyses.

sediment load The amount of material a stream is carrying at a given time.

sedimentation The process by which rock and organic materials settle out of water.

shaded riverine aquatic cover(SRA) Provides habitat complexity and diversity in the form of instream cover and a source of food for young fish, and has been defined as: 1) the adjacent bank composed of naturally erodible material, 2) riparian vegetation that either overhangs or protrudes into the water, and 3) the water containing variable amounts of woody debris (i.e., logs, branches, and roots).

Segment 1 The area along the Guadalupe River between I-880 and Hedding Street.

Segment 2 The area along the Guadalupe River between Hedding Street and Coleman Avenue.

Segment 3 The area along the Guadalupe River from Coleman Avenue to Park Avenue and from Woz Way to Park Avenue.

Segment 3A Portion of Segment 3 between Coleman Avenue and New Julian Street.

Segment 3B Portion of Segment 3 between New Julian Street and Park Avenue.

Segment 3C Portion of Segment 3 between Woz Way and Grant Street.

Segment 3C Phase 1 Portion of Segment 3C consisting of eastern riverbank between Woz Way and I-280.

Segment 3C Phase 2 Portion of Segment 3C consisting of eastern riverbank between I-280 and Grant Street, channel bed between Woz Way and Grant Street, and western riverbank from just downstream from Woz Way to Grant Street; construction components in this segment include riverbank and channel bed armoring, low-flow trapezoidal-boulder channel, recreation/maintenance trails, overlook plaza, and Woz Way to Park Avenue bypass inlet weir and inlet.

Segment 3C Phase 3 Portion of Segment 3C consisting of construction of flood training walls in the vicinity of I-280.

shoefly Temporary railroad crossing.

sill A submerged ridge separating two bodies of water.

simulated Constructing a physical model based on mathematical probability to examine a natural process.

simulation The application of a mathematical representation or model to analyze a theoretical or physical process.

smolt A young salmon or steelhead ready to migrate to the ocean after growing to sufficient age and size. Size about 80S120+mm.

smoltification The process by which salmon fry develop characteristics that allow them to live in salt water.

solubility The capacity of a substance to dissolve in water.

spawning gravel Rocks and pebbles deposited in stream beds that are just the right size for anadromous fish to move about as they lay their eggs.

spawn Laying of eggs, especially by fish.

special status species Plant and wildlife species that are federally listed, proposed for listing, or candidates for listing as threatened and endangered under the Federal or California Endangered Species Act.

spreader dams A water storage structure that promotes water percolation into a groundwater basin or aquifer.

steady flow Constant river flow.

stream channel geometry The shape of a water channel, including the height, width, and slope of its banks.

subreaches A small section of waterway, within a larger section of a waterway project.

subsidence The settling of land due to the compaction of soil caused by loading, oxidation of organic soils, removal of underground fluids, or other mechanisms.

take In general, killing of, damage to, or harassment of individuals of a protected species. Under the Federal Endangered Species Act, the definition includes the following activities, which are prohibited with regard to special-status species: harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to engage in any of these specifically enumerated activities. Under the Endangered Species Act, therefore, harassment and harm have been extended to include activities that affect habitat that supports listed species.

terrestrial A description of habitat or plant or wildlife species that live on or grow from land.

thalweg The line of maximum depth in the channel.

thermal suitability indicator A part of a habitat that can be measured as an indication of the habitat's ability to support a species.

toe 1) The downstream edge at the base of a dam. 2) The line of a natural or fill slope where it intersects the natural ground.

toe berm The section projecting at the base of a dam, levee, or retaining wall.

trapezoid/boulder low-flow channel concept A channel design approximately 2.5 feet deep, 12 feet wide at surface level, and 6 feet wide on the channel bed that promotes fish passage even when the waterway has little water in it.

turbidity The reduction of light transmission in water caused primarily by the suspension of clays, silts, and other fine materials.

underground bypass conduit Pipes installed underground for the purpose of diverting water around some object, perhaps as a fish passage.

Unsteady flow Variable river flow.

upland habitat Habitat in areas not inundated with water.

urbanization The construction of cities, including residential and commercial developments, that displace wildlife habitat.

vanes A structure in a waterway that diverts water in a particular direction.

vegetation community A group of plant species commonly occurring together in roughly similar proportions.

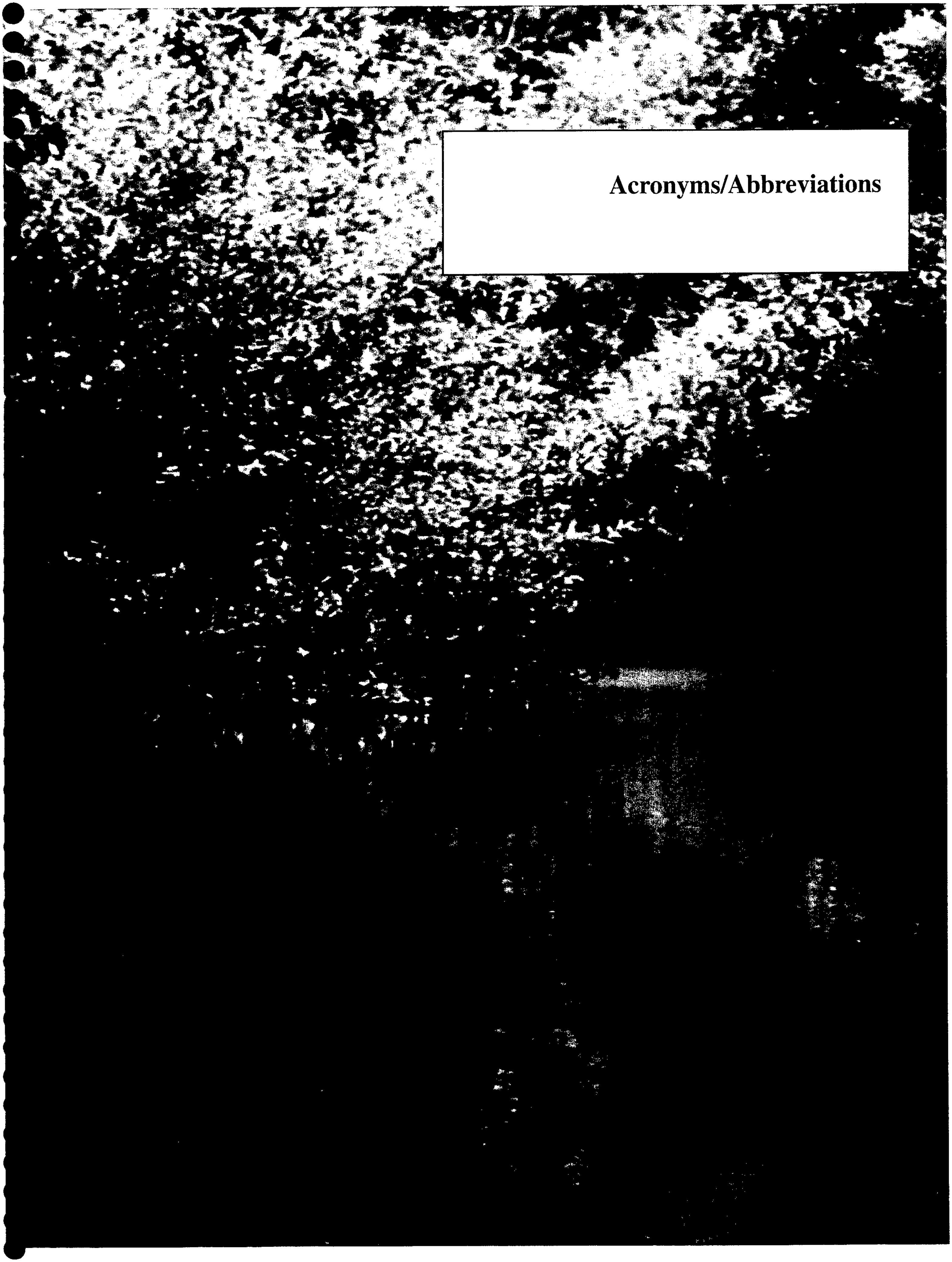
vortex rock weirs A weir constructed such that water flows from a small opening at its base, causing the water to form a whirlpool as it collects behind the weir.

watershed The area of a landscape from which surface runoff flows to a given point; a drainage basin.

weir A dam, wall, screen, or other structure in a waterway for the purpose of storing, diverting, screening, or measuring water.

wetland Transitional lands between terrestrial and aquatic areas, such as marshes, intertidal mudflats, and wet meadows, where the water table is usually at or near the surface or the ground is covered by shallow water. Wetlands can be freshwater areas, saltwater areas, or a mixture of both. The USFWS helps increase the amount of wetlands by providing incentives for farmers to flood fields and acquiring more dependable water supplies for Central Valley wildlife refuges.

Acronyms/Abbreviations



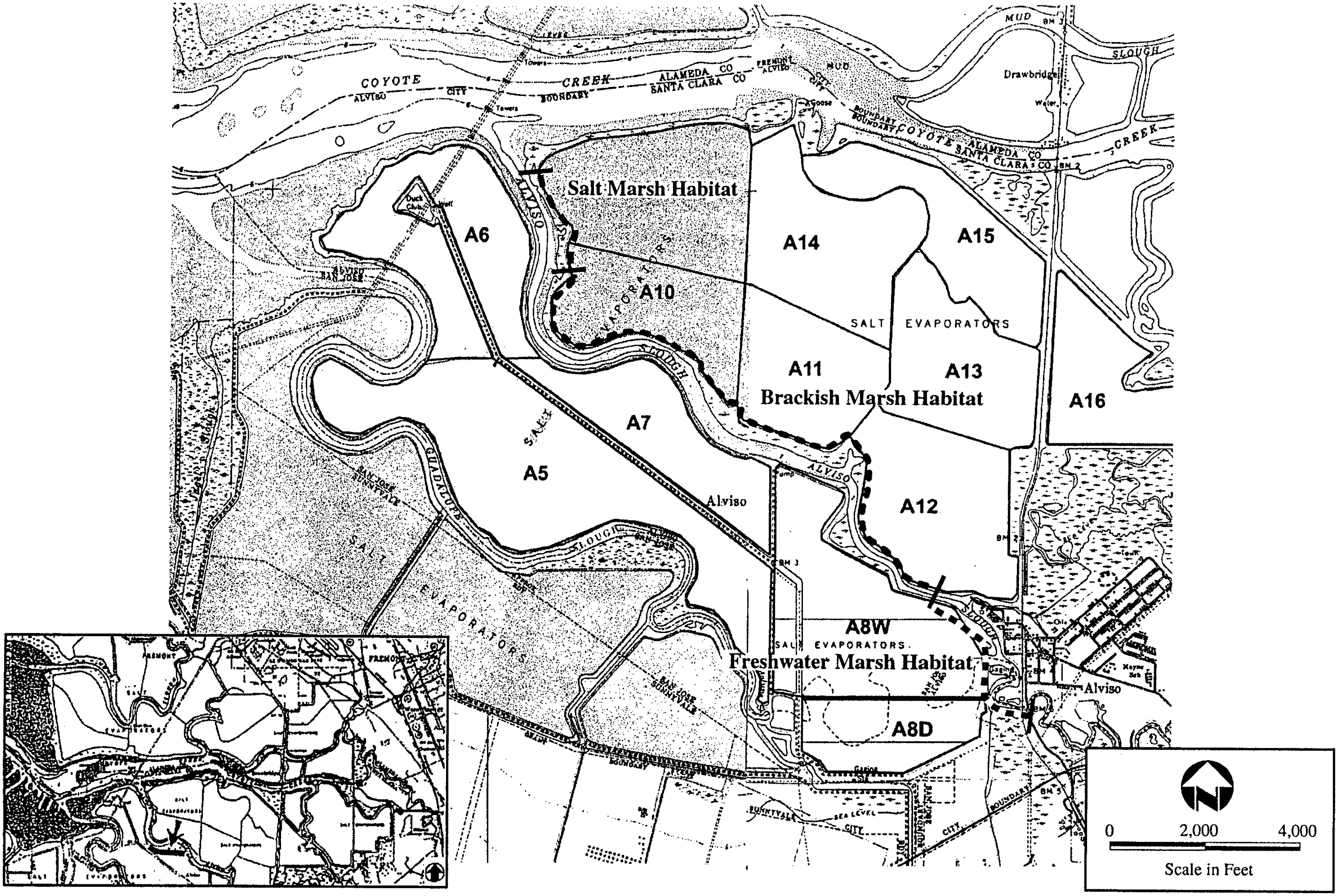


Figure 6.2-6. Tidal Marsh Habitat of Lower Guadalupe River - Alviso Slough Area

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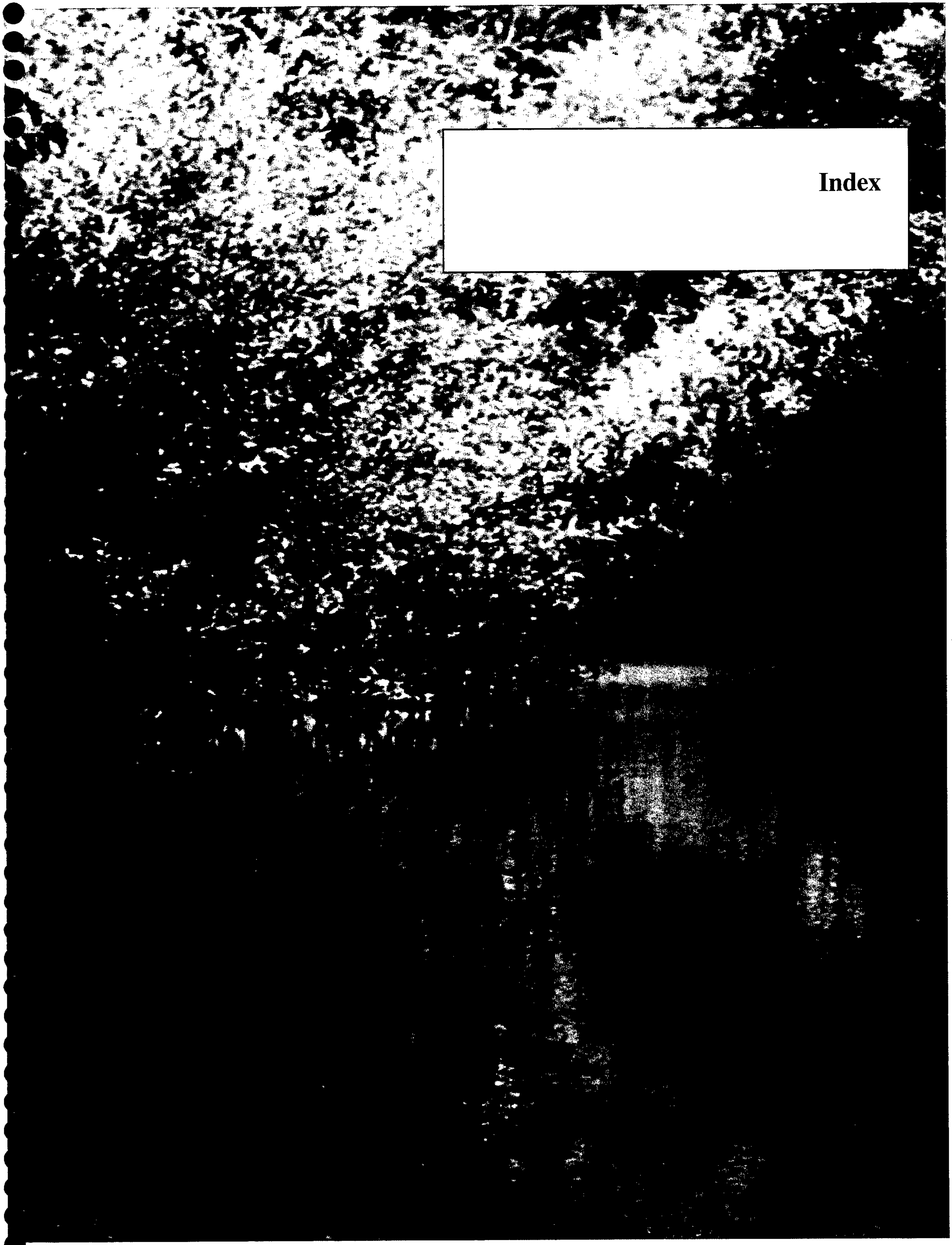

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